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Comparison of Health Promotion Behaviors and Performance on the Navy Physical Readiness Test among Active Duty Shipboard Personnel with and without Anterior Knee Pain

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COMPARISON OF HEALTH PROMOTION BEHAVIORS AND PERFORMANCE ON THE NAVY PHYSICAL READINESS TEST AMONG ACTIVE DUTY SHIPBOARD PERSONNEL WITH AND WITHOUT ANTERIOR KNEE PAIN

by

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Abstract

Health promotion is the number one health priority of the nation, yet, health promoting behaviors (HPB) are rarely part of the management plan for persons with anterior knee pain (AKP). In an active duty military population, AKP can interfere with performance on the required, semi-annual physical readiness test (PRT). The purpose of this descriptive, comparative study was to compare the relationships among HPB, AKP and performance on the PRT between two groups of active duty Navy shipboard personnel (those with AKP and those without AKP). Pender's (1996) Health Promotion Model (HPM) served as the theoretical framework. Subjects completed demographic and personal fitness questionnaires, the Health Promoting Lifestyle Profile (HPLP II) (S. Walker, 1996), and the Exercise Benefits and Barriers Scales (EBBS) (K. Sechrist,1987). Performance on the PRT and body mass index (BMI) for all subjects were examined. Data were obtained from 192 active duty Navy personnel stationed aboard four southern California based ships. Analysis included descriptive and inferential statistics. Results indicated that, when compared to the AKP group, subjects without AKP: (a) were significantly different in performance of the PRT, (b) were significantly more likely to perform health promoting behaviors, (c) were significantly more likely to perceive the benefits of exercise, (d) had a significantly higher perceived health score, and (e) were more likely to be nonwhite, have less formal education, married and lower in rank. Age, gender, time with diagnosis of AKP, and BMI were predictors of PRT outcome scores. Time and access to exercise equipment were considered very important factors to shipboard personnel. No significant relationship between AKP and performance on the PRT was identified.

DEDICATION

I would like to dedicate this dissertation to:

The memory of my sister, Bridget Ann Oliverio and her daughter, Antoinette Oliverio. Both of them lived life to the fullest, gave so much of themselves to others and were loved unconditionally by their family.

The memory of my sister, Joan Michella Morton who endured more adversity than any woman I know, and who, with the grace of God and her own fortitude, raised three beautiful children and had the respect and love from all those who knew her.

The memory of my mother-in-law, Frances "Peg" McKenzie, who believed in me, encouraged me and loved me. I learned a valuable lesson from her...the word "cannot" was not in her vocabulary. I pledge to remove it from mine.

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CHAPTER 1

INTRODUCTION

Health promotion and physical fitness are primary goals for the nation as noted in the Surgeon General's Report on Health Promotion and Disease Prevention (Department of Health and Human Services [DHHS], 1990). However, it is estimated that only one out of three Americans are aware of the Surgeon General's report on physical activity and health (DHHS, 1996), despite an aggressive media campaign to alert persons on the role of physical activity as a health promoting-disease preventing intervention (Morrow, Jackson, Bazzarre, Milne, & Blair, 1999).

Health promotion behaviors (HPB) are predominantly operationalized as those activities which promote a healthy lifestyle and prevent chronic disease. Specific elements that have been targets of research over the past 15 years include physical activity/fitness, smoking, alcohol use, diet/nutrition, obesity, stress management, cardiovascular disease, and the cost-benefit analysis of health promotion programs.

Much of the research is directed toward evaluating the level of awareness among specific populations on what constitutes health promotion (Duffy, 1988; Liang, Shediac-Rizkallah, Celentano, & Rohde, 1999), measuring perceptions on health promoting behaviors (Suni, Oja, Miilunpalo, Pasanen, Vuori, & Bos, 1998; Stuifbergen & Rogers, 1997; Alexy, 1991), providing education and counseling on health promotion (Calfas, Long, Sallis, Wooten, Pratt, & Patrick, 1996; Plach, Wierenga, & Heidrich, 1996) and conducting and evaluating the effectiveness of

specific interventions which are believed to promote healthy lifestyles and avoid disease (Leaf, Parker & Schaad, 1997; Trent & Hurtado, 1998).

The United States military also supports the national objectives and established its own Health Promotion directives in accordance with several major objectives of the Healthy People 2000 report (Department of Defense, 1986; Department of the Navy, 1992; Department of the Navy, 1997). Over the past decade, the military dedicated significant manpower and material resources to promote healthy behaviors and healthful lifestyles within the organization and among military personnel. Evidence suggests these programs are working (DoD, 1998;Trent & Hurtado, 1998)

There are over 1.3 million active duty personnel serving in one of five branches of the armed services, Navy, Army, Air Force, Marines and Coast Guard. Specifically, Naval personnel comprise 27 % (372,355) of the total military active duty population. Personnel are predominantly young, healthy and actively engaged in physical activity as part of their assignment. In addition, a healthy lifestyle among all military personnel promotes military readiness; in other words, they are prepared physically and mentally to support and defend the United States of America whenever and wherever they are called to action.

Interestingly, one of the most common complaints among physically active adults is musculoskeletal pain or injury. Anterior knee pain is cited as the number one symptom presented in orthopedic and sports medicine clinics (Clement, Taunton, Smart, McNicol, 1981; Garrick, 1989; James, Bates, & Osternig, 1978; Milgrom, Finestone, Shlamkovitch, Giladi, & Radin, 1996; Powers, 1998; and Zappala, Taffel, & Scuderi, 1992). The incidence of knee pain is higher among women than men (Clement, et al.,

1981; Fulkerson, 1983; Tria, Palumbo, & Alicea, 1992; and Laprade, Culham, & Brouwer, 1998) and a successful outcome of a cure ranges from 40 to 80% of the population (Almekinders & Almekinders, 1994; Milgrom, et al., 1996; Ruffin & Kiningham, 1993). Tria, et al., (1992) cited a 95% response to conservative treatment. This suggests that anywhere from 5-60% of persons with anterior knee pain do not achieve complete relief of pain and resumption of physical activity.

Typically, once the knee pain is documented as anterior knee pain of a non-operable and non-pathologic nature, it is treated with rest, bracing, application of cold packs, and non-steroidal anti-inflammatory agents. Following the acute episode of pain, quadriceps-training exercises are recommended to strengthen the supporting structures of the patella. Although several sources site anywhere from 40 to 80% full recovery, there are many adults who find only temporary relief from this regimen and/or fail to follow through on the treatment plan. Persistent anterior knee pain, despite conservative therapy, may require surgical intervention. It has also been suggested that persistent pain could lead to patellofemoral osteoarthritis (Grana & Kriegshauser, 1985; Messier, Davis, Curl, Lowery and Pack, 1991).

Statement of the Problem

Twice a year, active duty Navy personnel are required to complete a physical readiness test (PRT) that includes a one and one-half mile run within a specific period of time. Running is often cited as a major physical activity that precedes the onset of symptoms associated with anterior knee pain (Garrick, 1989; Clement et al., 1981; James & Bates, 1978; and MacIntyre & Robertson, 1992). The onset of anterior knee pain, though insidious, is frequently detected when an individual is unable to run due to knee

pain. Although the pain is present while training for or performing the PRT, the military member will often continue to run rather than choose an alternative aerobic option such as swimming or accept the risk of failing the fitness test.

Health promotion behaviors are important indices of personal well-being and disease prevention. Possibly, by altering the focus of managing anterior knee pain from the traditional biomedical model and to incorporate principles of health promotion, it may be conceivable to improve patient outcomes, reduce lost work time and avoid surgical intervention. If health promotion behaviors can explain or predict the presence or absence of anterior knee pain and/or predict the potential for developing anterior knee pain, then further investigation is warranted.

Purpose and Specific Aims of the Study

The purpose of this study is to identify relationships among health promoting behaviors and performance on the Navy PRT in the presence or absence of AKP among active duty military shipboard personnel. The specific aims of this study are:

1. To examine the frequency of performing health promotion behaviors in two groups of active duty military shipboard personnel, those with and those without AKP.
2. To examine performance on the Navy PRT in two groups of active duty military personnel, those with and those without AKP.
3. To explore the relationship between a personal fitness program, Body Mass Index (BMI), perceived barriers to exercise and perceived benefits of exercise, and the frequency of health promotion behaviors in a group of active duty military personnel with or without AKP.

4. To explore the relationships between the following: age, gender, education, socioeconomic status (as determined by rank structure alone), ethnicity and marital status, health promotion behaviors, and performance on the Navy PRT in a group of active duty military shipboard personnel with or without AKP.

Significance of the Study

The findings of this study may enhance understanding of the relationships between health promotion behaviors, the presence of AKP and overall performance on the PRT. It may also help to identify the perceived benefits and barriers to adopting and maintaining health-promoting behaviors in relation to physical activity and health. This knowledge may in turn affect the type of exercise activity that is conducive to promoting healthy behaviors within a military population that serves aboard Navy ships.

Many nurses serve in the role of health promotion officers and primary care providers within the Military Healthcare System (MHS). Information from this study may serve as a stimulus to explore similar issues among other military populations, to provide data that supports changes in current policy and procedure and to support nurses in primary health care settings who evaluate health promoting behaviors as part of the routine assessment for all military members.

Medical management of anterior knee pain rarely takes into full account the individual's personal fitness program or health promotion behaviors such as nutrition, exercise, stress management, social support, and other health promoting activities. However, nursing assessment and management traditionally and routinely supports health-promoting behaviors for a very diverse acute or chronically ill population.

Traditional medical management is not always successful. Alternative treatment and management options must be explored.

Theoretical Framework

Pender's (1996) health promotion model serves as the guiding theoretical framework for this study. In this model individual characteristics, experiences and behavior-specific cognition and affect lead toward a commitment to adopt and perform health-promoting behavior. The model consists of 10 determinants of behavior which are: (a) prior related behavior; (b) personal factors; (c) activity related affect; (d) perceived self-efficacy; (e) perceived barriers to action; (f) perceived benefits of action; (g) interpersonal influences; (h) situational influences; (i) commitment to a plan of action; and, (j) immediate competing demands and preferences. Relationships among these variables and the major concepts of this research may provide clues to help explain and predict the health promoting behaviors that impact the presence or absence of knee pain and specific performance on the Navy PRT.

Each of the 10 determinants of behavior has been empirically tested and validated on various populations, among most age groups, across several ethnicities, along the health-illness continuum and with both genders (Felton, Parsons, & Bartoces, 1997; Fowler, 1997; Stuifbergen & Rogers, 1997; and Volden, Langemo, Adamson, & Oechsle, 1990). Physical fitness and exercise were two more frequently tested variables (Duffy, 1988; Evans & Nies, 1997; Felton & Parsons, 1994; Felton, Parsons, & Bartoces, 1997; Felton, Parsons, Misener & Oldaker, 1997; Gillis & Perry, 1991; and Pender, Walker, Sechrist, & Frank-Stromborg, 1990). However, no studies exist that test the variables in the model with the population planned in this study.

The major concepts of the health promotion model as it pertains to this research are presented in Figure 1. Using the HPM as a guide, the three major concepts of the model, (a) individual characteristics and experiences, (b) behavior-specific cognitions and affect, and (c) behavioral outcome remain the three major concepts of the research model. Seven of the ten determinants of behavior were selected for this model; (a) prior related behavior; (b) biologic and sociocultural personal factors; (c) perceived barriers to action; (d) perceived benefits of action; (e) activity related affect; (f) situational influences; and (g) interpersonal relations. Specific measurable variables related to this study were designated for each of the seven determinants of behavior. The major concepts and the methods of measurement are outlined in Table 1. The following paragraphs provide more detailed information on how each of the determinants of behavior was evaluated and a description of the instruments used.

The biological and sociocultural personal factors were determined by the participant's age, gender, rank, socioeconomic status (SES), marital status, ethnicity, education, and BMI (Figure 1). The first column, designated as individual characteristics and experiences, includes prior related behavior. Prior related behavior was assessed through a Personal Fitness Questionnaire, designed by the researcher, on the individual's personal fitness program prior to and following the diagnosis of AKP (Appendix B). Health promoting behaviors was assessed using the Health Promotion Lifestyle Profile II (Appendix C). The presence or absence of knee pain was assessed using Appendix A and B.

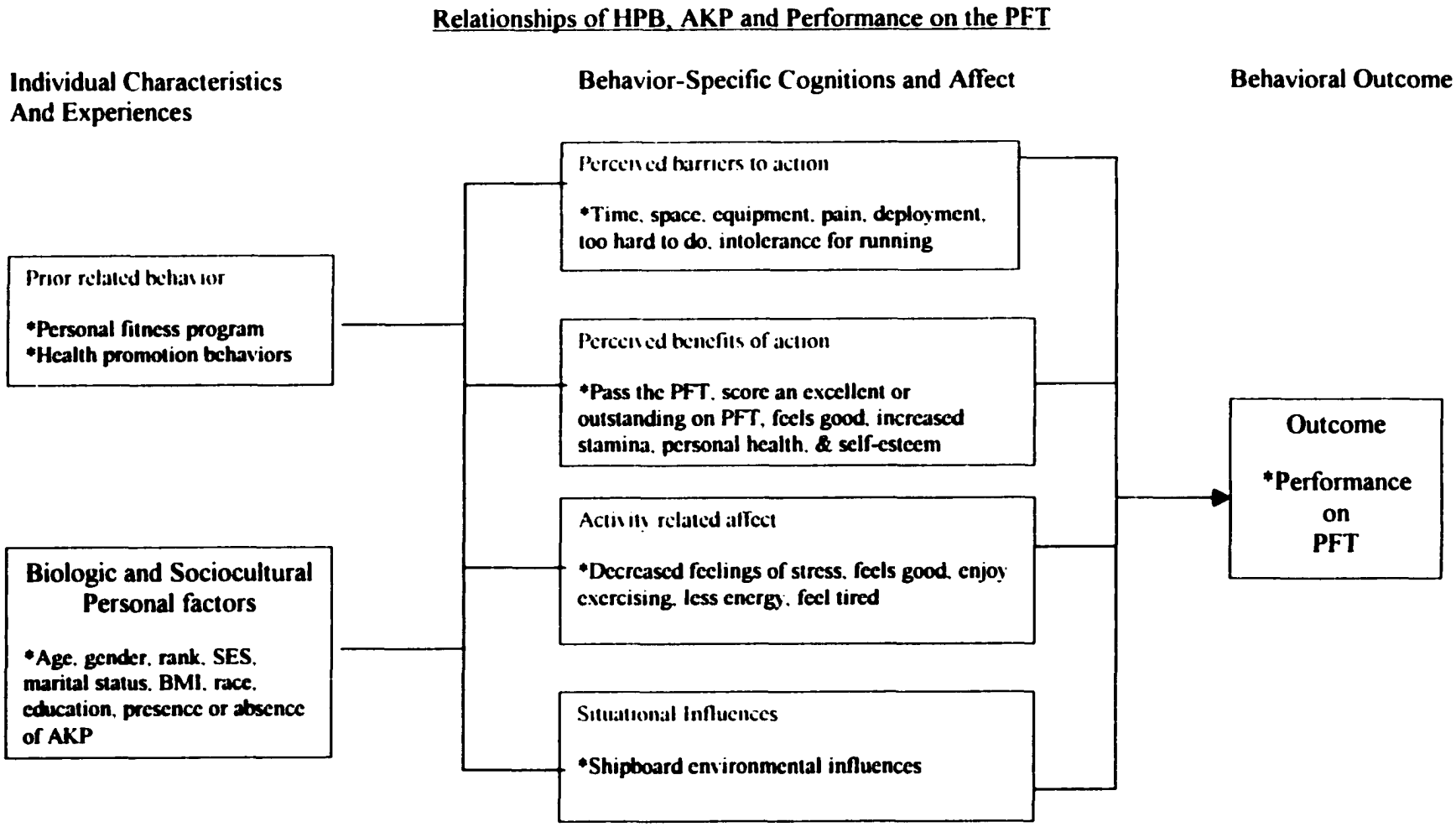

Figure 1 Theoretical model of relationships of health promotion behavior (HPB), anterior knee pain, (AKP), and performance on the physical readiness test (PRT) based on the HPM (Pender, 1996)

Table 1

Major Concepts of Model and Measurement Methods

MAJOR CONCEPTS	MEASUREMENT METHODS
Individual Characteristics and Experiences	
Prior related behavior	
Personal Fitness Program	Personal Fitness Questionnaire
Health Promotion Behaviors	Health Promotion Lifestyle Profile II
Biologic and Sociocultural Factors	
Age, gender, presence or absence of AKP, BMI	Demographic Questionnaire Navy Personnel 6110/2
Rank, SES, Marital status, education	Demographic Questionnaire
If AKP present, treatment, effectiveness, and effect of personal fitness program	Personal Fitness Questionnaire
Behavior-Specific Cognitions and Affect	
Perceived barriers to action	Exercise Benefits and Barriers Scale
Perceived benefits of action	Exercise Benefits and Barrier Scale
Activity Related Affect Interpersonal Influences	Exercise Barriers and Benefits Scale and three of the six subscales on the Health Promotion Lifestyle Profile II
Situational Influences	Personal Fitness Questionnaire
Behavioral Outcome	
Performance on the PFT	Navy Personnel 6110/2

The second column, in Figure 1, labeled behavior-specific cognitions and affect, contains five elements that include perceived barriers to action, perceived benefits of action, activity related affect, interpersonal influences, and situational influences. Perceived benefits and barriers were measured using the Exercise Benefits/Barriers Scale (EBBS) developed by Sechrist, (1987) (Appendix D). Activity related affect and interpersonal influences include items that reflect an individual's emotional responses and social support systems that promote or impede health promoting behaviors and was measured with the EBBS and the HPLP II subscales on stress management, interpersonal relations, and spiritual growth. Situational influences were determined by evaluating the shipboard environment as it relates to exercise behaviors and measured using the PFQ.

In the last column, titled behavior outcome, the variable performance on the PFT was assessed using the NAVPERS 6110/2 (Appendix E). The major concepts of the model and instruments used to measure each variable are presented in Table 1.

Hypotheses

The specific hypotheses, based on the proposed model (Figure 1) and from review of related literature are:

1. There is no difference in the frequency of health promotion behaviors between active duty military shipboard personnel who do not have anterior knee pain and those who do have anterior knee pain.
2. There is no difference in Navy PRT scores between active duty shipboard personnel with or without anterior knee pain.

3. There is no difference between active duty military shipboard personnel with or without anterior knee pain on participation in a routine personal fitness program, BMI, perceived barriers to exercise, perceived benefits of exercise, frequency of health promotion behaviors, and perceived health status.
4. There is no difference between the two groups of active duty military personnel with or without knee pain on the basis of gender, age, ethnicity, marital status, education, rank (SES) or time in service.

Definition of Terms

The following operational definitions of the key elements of this study are delineated below:

Health promotion behavior(s): any actions or behaviors taken by individuals to improve or promote well-being or health (Kulbok, Baldwin, Cox, & Duffy, 1997).

Anterior knee pain: medically diagnosed malalignment of the patella or a self-assessed diagnosis which included the following symptoms in at least one knee and of greater than two months duration: (a) insidious onset, (b) dull and aching pain, (c) crepitus, (d) giving way, (e) locking, and excluded recent history of trauma, hemorrhage and damage to the supporting knee structures.

Active duty personnel on board military ships: any current, active duty member of the military who was serving on board a Navy vessel or who had served a minimum of one year on a Navy vessel within the last three years. This excluded all active duty military members who had not served on a ship within the past 3 years.

Physical Readiness Test: a semiannual, required measure of aerobic fitness, strength and flexibility as conducted by the United States Navy and Marine Corps.

Individual Characteristics: personal characteristics and experiences that affect subsequent actions (Pender, 1996). This consisted of two variables, prior related behavior and personal factors.

Prior related behavior: the presence or absence of a personal fitness program and knowledge-based activity related to performance of exercise, the type, duration, intensity, frequency and measuring one's heart rate.

Personal biologic factors: included the variables of age, gender, and BMI.

1. Age is defined by the active duty member's age at the time of performance on the PRT. The test parameters are based on specific age groups. The individual may be one age when the PRT is performed (October and April of the calendar year) and a different age at the time of data collection (from February through April, 2000). The age category is based on five distinct age groups for the PRT and its scoring parameters.
2. Gender is defined as female or male.
3. Body Mass Index (BMI) was calculated by dividing weight in kilograms by the square of the height in centimeters. (Keller & Thomas, 1995).

Personal sociocultural factors: included the variables of race, education, marital status and SES.

1. Race: defined by the subject's designation of one of the following five categories: Native American, African American, Hispanic American, Asian American, and Caucasian. A sixth category, designated as "Other (please specify)" is provided to capture ethnic diversity.

2. Education: defined as highest level of schooling completed and may be designated in one of four categories: high school or equivalency, 1-2 years of college or technical school, Bachelor's degree, and postgraduate degree.
3. Marital Status: defined in one of four categories: never married, married, divorced, or widowed. The subject was directed to select only one of the four options although it is possible he or she may currently be in one marital state yet had experienced another.
4. Socioeconomic Status (SES): the rank of an active duty subject. There are nine enlisted ranks (E-1 through E-9), four Chief Warrant Officer (CWO) ranks (CWO-1 through CWO-4) and 10 officer ranks (O-1 through O-10). The subject was asked to write in his/her rank.

Behavior-Specific Cognitions and Affect: beliefs, knowledge, attitudes and intentions to perform the behaviors associated with exercise and health. The following variables of the HPM were considered to be of major motivational significance (Pender, 1996, p.68). Specific to this study, they included perceived benefits of action, perceived barriers to action, activity-related affect and situational influences.

Perceived benefits of action: beliefs about the effectiveness of recommended actions in preventing the health threat (Pender, 1996, p. 35). Specifically, perceived benefits of exercise (the action) were the primary focus. These benefits included passing the PRT, scoring an excellent or outstanding on the PRT, increased stamina, personal health, feels good and improved self-esteem.

Perceived barriers to action: perceptions concerning the potential negative aspects of taking action (Pender, 1996, p. 35). Specifically, perceived barriers to

exercise (the action) were the primary focus. These barriers included time, place, equipment, ability to perform the exercise, difficulty with exercise, pain with exercise or intolerance to exercise.

Activity related affect: emotional response to exercise. These responses may be positive or negative. Examples included feeling less stress, liking exercise, feeling tired, and experiencing a lack of energy.

Situational influences: included personal perceptions and beliefs of a situation that encouraged or impeded the likelihood of performing health-promoting behaviors (Pender, 1996, p. 71). Specifically, the shipboard environment served as the dominant feature for this variable. Military ships consist of steel decks (flooring), narrow passageways with raised steel partitions that are approximately at knee level and many steep, and steel ladderwells (stair cases) that connect the decks to one another. Steel ladders are used to climb 10 feet or more up to work on the airplanes carried aboard many of the ships. In many instances, these surfaces were used for personal fitness training, especially when deployed to sea.

Behavioral Outcome: the resulting actions that promote or jeopardize the likelihood of continuing to commit to and maintain health-promoting behaviors (Pender, 1996). The measurable variable was health-promoting behavior.

Assumptions

1. It is expected that subjects with AKP have been treated using traditional medical interventions. However, it is unknown whether or not performance on the PRT would be affected by the presence of AKP.

2. Pender's HPM does not incorporate a "fear factor" as motivation to pursue health promoting behaviors. Although active duty military personnel are at risk for administrative action by the Navy as a result of failing any portion of the PRT, it is the researcher's opinion that most active duty members are motivated by feeling good, looking good and leading a healthy lifestyle. Fear of administrative action is not a primary motivating factor to seek and employ health-promoting behaviors.
3. All of the data obtained from the NAVPERS 6110/2, Risk Factor Screening/Physical Readiness Test Results reflect accurate information obtained at the time of testing.

CHAPTER 2

REVIEW OF THE LITERATURE

The major concepts of this study are presented below. An analysis of the Navy's role in health promotion is explored and the relationships among health promotion, anterior knee pain, and performance on the physical readiness test is proposed.

Health Promotion

In 1979, the Surgeon General of the United States released a report on Health Promotion and Disease Prevention (DHHS, 1990). At that time, the focus on health promoting behaviors was specific for five different age groups, infants, children, adolescents, young adults and older adults. Disease prevention and health promotion were goals held equal in importance. Education programs targeting immunizations, alcohol use, drug use and heart disease received national attention and encouraged the nation to practice behaviors that promoted a healthy lifestyle and prevented the threat of disease.

In 1987, work on the next decade's goals began. Success on several of the objectives for the 1980 Healthy People report encouraged public health services, scientists, health care professionals, communities, individuals, volunteer agencies and others to develop new goals as reported in Healthy People 2000 (DHHS, 1990). Three main objectives were defined:

1. Increase the span for healthy life for Americans.
2. Reduce health disparities among Americans.
3. Achieve access to preventive services for all Americans.

Health promotion, health protection and preventive services served as the umbrella for over 300 specific objectives and 22 areas of priority to be achieved by the year 2000. Health promotion priorities included increasing physical activity and exercise, and reducing domestic violence and abuse. Health protection initiatives featured environmental, occupational and oral health services. Health preventive services embraced maternal and infant care, diabetes, HIV infection and cancer.

McGinnins and Lee (1995) conducted a mid-decade review of the Healthy People 2000 goals and found evidence of considerable progress toward several targeted goals. Specific to health promotion, fewer adults were using tobacco products, more adults were exercising and there were fewer alcohol-related automobile deaths. However, trends also suggested no change in sedentary lifestyles and an increase in the overweight population. Workplace health promotion programs were on the rise, cholesterol levels were lower and there were fewer deaths related to heart disease and stroke.

Currently, goals have been developed for the latest Surgeon General's Report and the Healthy People 2010 plan which was released in January, 2000 (DHHS, 1998). Enormous changes in technology, managed care, culturally diverse populations and emerging global health trends such as infectious disease, hunger and starvation will guide the development of new goals, objectives and strategies. Healthy People 2010 was also intended to be this nation's contribution to the World Health

Organization's (WHO) commitment to global health promotion, disease prevention and preventive services for all people.

In addition to the health promotion programs supported by Healthy People 2010 and the WHO, the American Nurse's Association (ANA) formally recognized the commitment nurses have to health promotion. In the ANA's Social Policy Statement (1995), it states: "Nursing involves practices that are restorative, supportive and protective in nature...Promotive practices mobilize healthy patterns of living, foster personal and family development, and support self-defined goals of individuals, families and communities" (p. 11).

Historically, nurses have served as leaders in public health beginning with Florence Nightingale's legendary service during the Crimean war and her personal crusade for a healthy environment and nursing education. Lillian Wald and Lavinia Dock made notable contributions related to women and children's health in the 1800's and founded the Henry Street Settlement House. Public health nurses made incredible strides to reduce infant mortality, increase childhood immunizations and provide health education services to all members of a community (Kalisch & Kalisch, 1996)). Today, nurses are emerging in numerous hospital, clinic, community and global environments to serve in a myriad of capacities related to health promotion, disease prevention and preventive services. Exact numbers of nurses serving in primary roles in health promotion and preventive services is unknown (Pender, Barkauskas, Hayman, Rice, & Anderson, 1992). Whether at the individual, family, community, or global level, the nursing domains of health, environment and

person will guide the future of nursing's role into the 21st century and toward the goals of Healthy People 2010.

Health Promotion and the Navy

Part of the overall mission of the U. S. Navy is to promote and maintain the health and well being of its members. In 1986, the Department of Defense (DoD) established a health promotion program "to improve and maintain military readiness and the quality of life of DoD personnel and other beneficiaries" (DoD, 1986). This program replaced several smaller and very specific programs and policies on smoking in federal buildings, alcohol and drug abuse education and training, the physical fitness and weight control program and rehabilitation services for alcohol and drug abusers. Although the most recent directive (Department of Navy, 1992), maintained smoking, alcohol, drug abuse, physical fitness and exercise as key components of the new health promotion program, it further incorporated nutrition, stress management and hypertension control into its definition of health.

The revised health promotion program focused on elimination of smoking from federal buildings, medical treatment facilities, common work areas, individual living quarters where two or more individuals are assigned to one room, and DoD schools. Designated smoking areas included private offices, and spaces where ventilation capacity was adequate so as not to interfere with non-smokers. In addition, more smoking cessation programs and public education materials were made available. Health care providers were encouraged to inquire about the patient's tobacco use during routine dental and physical exams and encouraged to offer cessation programs to smokers.

In addition to smoking cessation, a greater emphasis was placed on physical fitness and exercise. Health professionals were directed to focus attention on cardiovascular fitness for all military personnel. Exercise programs to enhance physical fitness and military readiness were to be encouraged. Commandants of military bases were to ensure availability of fitness programs, facilities, and trained personnel to meet the goal of physical fitness.

Nutrition programs gained new importance in the overall health promotion program within the Navy. New emphasis on healthy food choices, greater availability of fresh fruits, vegetables and whole grain products and conveniently labeled nutrition information in military food establishments helped to encourage healthier eating habits and weight control. Even snack concessions and vending machines were to carry a number of healthy food choices such as juice, fresh fruit and whole grain snacks. Nutrition information, counseling and risk factor modification related to diet and exercise were made available.

Stress management programs were introduced to help military members cope with the stress of their job, their environment and work relationships. Stress management workshops were incorporated into educational curricula in military schools and all active duty members, family members and retirees were encouraged to participate. Frequent transitions from military base to military base, family separations, and long deployments on ships and overseas were recognized as highly stressful situations uncommon to most non-military personnel.

Alcohol and drug use or abuse continued to receive significant attention. "Zero" tolerance for drug use became the mantra for the military. Alcohol prevention

programs were awarded greater emphasis and younger military personnel were closely targeted for prevention of alcohol use and abuse and the alternative choices to alcohol.

Hypertension programs were added to the health promotion agenda. High blood pressure screening became a routine part of all physical and dental exams for active duty members. Mass hypertension screenings and public information campaigns by each and every command were encouraged. Literature on risk factor screening, early detection of hypertension and appropriate treatment were made widely available.

In 1992, the U. S. military, and specifically the Navy, adopted the tenants of Healthy People 2000 and revised their health promotion program to "encourage healthy lifestyles and increase organization and individual readiness" (Department of the Navy, 1992; Bureau of Medicine Instruction, 1992). Although the scope of the program continued to focus on alcohol and drug use, smoking cessation, nutrition education and weight control, stress management, and hypertension, two additional elements were added; suicide prevention and back injury prevention. The category previously known as physical fitness and exercise was changed to physical fitness and sports. The major focus changed from providing a work environment conducive to improving and protecting health and supporting individuals to engage in healthy lifestyles to a focus that is "a combination of health education and related organizational, social, economic and health care interventions designed to improve or protect health" (Department of the Navy, 1992).

Important changes included much stronger policies related to smoking with significant restriction of designated smoking areas. The rights of nonsmokers prevailed over the rights of smokers whenever and wherever conflict existed. Smoking was prohibited in front of any potential enlistee such as in recruit commands, or in the presence of students such as midshipmen, officer candidates or other trainees. Tobacco products were no longer available for sale at any medical or dental treatment facility and tobacco products could not be used in government vehicles or on military flights less than six hours (Department of the Navy, 1992).

Weight control, nutrition education and physical fitness received greater attention with a major focus on helping the military member maintain body composition standards. Suicide prevention and back injury prevention programs reflected an emphasis on mental health and mental disorders and injury prevention from the Healthy People 2000 objectives for health promotion, health protection and preventive services (DHHS, 1990).

The Marine Corps health promotion program, Semper Fit, was established in 1997 by the Commandant of the Marine Corps (Marine Corps Order, 1997). It too reflects the Healthy People 2000 program and has been specifically tailored to the greater physical demands and special needs of the Marine Corps. Sexually transmitted disease (STD) and Human Immunodeficiency Virus (HIV) prevention programs were added to the original seven elements listed above. Excessive alcohol and tobacco use was considered a major concern for the Marine Corps and specifically targeted for change. Peak physical fitness is required to "maintain the 'ultimate weapon', the U. S. Marine" (Marine Corps Order, 1997) and therefore considered of very high

importance. Healthier lifestyles for the marine and his or her family became the primary focus of the Marine Corps health promotion program.

When the Department of Defense defined its health promotion program, it also designed measurable outcomes to specifically examine substance abuse among active duty military personnel and the extent of progress on Healthy People 2000 goals. Since 1980, seven surveys have been conducted by the Research Technical Institute under the auspices of the Office of the Assistant Secretary of Defense (Health Affairs).

The most recent survey was conducted in 1998 and examined the prevalence of alcohol, illicit drug and tobacco use, the negative effects of alcohol use ... and estimates for health behaviors pertaining to fitness and cardiovascular disease reduction, injuries and injury prevention, STD risk reduction, and an assessment of mental health of military personnel, dental health, gambling behaviors and special gender-specific health issues pertaining to women and men's health" (Department of Defense, 1998). The target population was all active duty military personnel except recruits, academy students, military persons absent without leave (AWOL) and persons in transit from one duty station to another. The total number of participants was 17, 264 military members (5449 Army, 3390 Navy, 3622 Marine Corps, and 4263 Air Force). The Navy sample represented approximately 10% of the current active duty Navy population and the Marine Corps sample represented approximately 20% of the current Marine Corps active duty population. Participants answered the questionnaires anonymously and represented all ranks within the military. Overall response rate was 59%.

The findings of this comprehensive study were too numerous for the intentions of this paper. However, overall trends related to health promotion behaviors are addressed.

Altogether, there was a downward trend in the use of alcohol, tobacco and illicit drugs. The lower cigarette smoking use was "a first" in all the DOD surveys. Heavy alcohol use remained a significant problem and cigarette smoking (29.9%) remained above the Healthy People 2000 objective of 20% by the year 2000.

Military personnel met or exceeded the targets of; overweight for personnel aged 20 or older, strenuous exercise, seat belt use, Pap smears ever received and Pap smears received in the past 3 years. In the under 20 age group, women met the goal of no more than 15% overweight. Military personnel were 10 percentage points or less from the Healthy People 2000 goals in seven other behaviors. These included overweight for personnel under age 20, blood pressure screening in the last 2 years, helmet use for motorcyclists and bicyclists, condom use and no cigarette or alcohol use during pregnancy.

Other issues that received attention were stress management and mental health. Deployments and family related stresses were rated high among military personnel. Job performance and injuries in the workplace were higher for those who experienced higher levels of stress. Alcohol was a commonly employed coping mechanism. Depressive symptomatology was rated higher among female personnel and 18.3 % had thought about suicide or self-injury. Approximately one in three women expressed higher rates of stress associated with being a female in the military.

Enlisted, younger, married women without a spouse present and with lower levels of education were most at risk.

Overall trends for healthy lifestyles for military personnel demonstrated a positive course. However, the findings indicated that there were vulnerable pockets of military personnel who experienced higher levels of stress, poorer coping styles, tobacco and alcohol abuse, and higher incidence of the need for mental health intervention.

Trent and Hurtado (1998), evaluated lifestyle factors and physical fitness in a group of 2216 Navy personnel. Subjects included active duty Navy personnel who were on active duty between 1983 and 1994. Personal Lifestyle Questionnaires were mailed to all subjects. Response rate for the two cohorts was exceptional at 96.7% for the 8-year sample and 91.8% for the 11-year sample.

In this longitudinal study, several interesting variables were assessed such as Navy PRT scores for 1983, 1989 and 1994, body fat, lean body mass, physical fitness, physical activity, dietary practices, alcohol and smoking use, hypertension and job related stress. Analysis revealed an overall trend toward better eating, smoking and drinking habits, an increase in physical activity, consistently good scores on the Navy PRT and an increase in lean body mass. However, it was also noted that there was an increase in body fat percent for both men and women and an increase in hypertension among the men.

Gender differences were also analyzed. More women were in the overfat category at the 11-year follow-up, but results were considered somewhat skewed due to the small number of female participants. The significant gender difference in

overfat women was due to a small number (N=5) of females who fit this category. Women scored higher than men on the push-up segment of the PRT, had better dietary habits, smoked and drank less than men, had a slightly higher incidence of job stress and were less likely to have hypertension. The authors suggest that the results of this study indicate that the Navy's health promotion program has had a positive impact on career Navy personnel.

In a recent study by Kelley (2000), health perceptions, physical self-efficacy, perceived barriers to exercise and exercise behaviors were examined on two groups of Navy personnel, those who successfully completed the PRT and those who failed the PRT. Kelley found that education, race, rank, weight, gender and exercise behaviors were significant predictors of personal physical fitness. Females and those subjects with a college degree were significantly more likely to be physically fit and to pass the PRT. Overweight subjects were significantly more likely to fail the PRT and those subjects who reported engaging in exercise were 100% more likely to pass the PRT. The findings have a compelling impact on the benefit of physical fitness and exercise for the active duty military member.

The Navy Physical Readiness Test

The Navy physical readiness test (PRT) made its debut in the early 1980's in response to a need for standard measures in weight and cardiovascular fitness. A number of changes have occurred since its inception including the addition of a push-ups component, weight standards, body fat percent measure if unable to meet height/weight standards and several modifications related to body fat percent parameters using the body mass index (BMI) formula. Even the Navy's most recent instruction on the physical readiness program (Department of Navy, 1998), was undergoing revision due to a high attrition rate because military members who failed the PRT were being administratively separated, (or discharged from the Navy) in high numbers (Hodgdon, 1999).

Current PRT standards include several important elements. Consistent with the military health promotion program, the PRT was designed to "assure mission readiness and operational effectiveness of every Navy member" (Department of Navy, 1998). The basic premise was to assure cardiovascular conditioning, reduce body fat composition and maintain flexibility and endurance. In order to meet these goals, a comprehensive program was developed. The PRT is conducted on a semi-annual basis.

First and foremost, each military member is required to complete a risk factor screening questionnaire consisting of eight questions related to age, medical history, chest pain or discomfort, proneness to heat exhaustion, recent change in medical condition that could limit participation in the PRT, family history of heart disease or stroke, significant weight change and tobacco use. If "yes" is answered to any of the

questions, the individual must undergo a medical exam and be medically cleared to participate in the PRT.

The next element is height, weight and body fat percent measurements. Excess body fat is associated with hypertension, diabetes, heart disease and cancer (American Heart Association, 1994; Kannel, 1990) and can interfere with activities that require a high level of physical exertion. The 1983 Metropolitan Life Insurance Height-Weight Tables are used as the standard measure for the Navy. If a military member does not meet the weight limit for height, then body fat percent is calculated. For women, the waist circumference and hip circumference are summed. Then the neck circumference is subtracted from the hip + waist sum. The remaining total circumference is compared to the female's height chart to determine body fat percent. For men, the neck circumference is subtracted from the waist circumference. The remaining total circumference is compared to the male's height chart to determined body fat percent for men. This method of measuring body fat percent has 3-4% margin of error. The Navy standard for body fat percent is 22% for men and 33% for women (Hogdon, 1999).

BMI is calculated by weight in kilograms divided by the square of the height in meters (Keller & Thomas, 1995). Although BMI does not distinguish between fat and non-fat tissue and therefore persons who are near weight standards may still be at risk for obesity-related illnesses, it is an easy, general measure of body fat composition. BMI will be calculated in this study due to the ease of obtaining the measurement and its reliability as a general measure of obesity.

The 1998 survey of DoD health related behaviors revealed an interesting picture of standards related to BMI. Using the Healthy People 2000 criteria, military men, under age 20, were considered overweight if BMI was 25.8 or greater and if they were older than 20, a BMI of 27.8 was the baseline for overweight. Among women who were 20 or younger, a BMI of 25.7 or greater was considered overweight and for those women older than 20, a BMI of 27.3 was the standard for overweight The standards are considerably stricter for men and women when compared to the HP2000 criteria.

In the 1998 survey, new criteria based on BMI alone were analyzed to help the military assess the potential for adopting new and stricter standards for BMI. The new measure is based on guidelines developed by the National Heart, Lung and Blood Institute (NHLBI) in the summer of 1998. Four levels of overweight were defined regardless of age or gender. They were (a) overweight-BMI of 25.0 to 29.0; (b) obesity I-BMI of 30.0-34.9; (c) obesity II-BMI of 35.0-39.9; and (d) extreme obesity-BMI 40.0 or greater.

The results of the survey showed that 22.9% of all military personnel under the age of 20 were classified as overweight and 19.5% of personnel over age 20 were defined as overweight based on the Healthy People 2000 guidelines. Using the NHLBI guidelines, considerably higher percentages were identified. In the group of military personnel 20 years or younger, 30.5% were overweight and in the group of military personnel older than 20 years of age, 53.9% were overweight. These percentages represent an aggregate of the four levels of overweight as defined by the NHLBI.

If the military were to adopt the NHLBI guidelines, many personnel who currently meet the Navy standards for BMI would be considered obese and subsequently fail to meet this standard. Failure to meet any one standard of the PFT constitutes an overall failure and results in remedial fitness training. Three consecutive failures constitute grounds for administrative action at the discretion of the commanding officer.

The third element of the PRT consists of measures of flexibility, endurance and aerobic capacity. The flexibility component is measured using the sit-reach test. The individual must be able to sustain a toe touch for one second. Failure of this portion of the test occurs when military members cannot touch their toes on at least one of three tries. This is the only element of the entire PRT that does not constitute an overall failure.

Indicators for muscular endurance include curl-ups (sit-ups) and push-ups. Very specific criteria for performance of a sit-up and push-up are outlined in the instruction and are explained in detail before every test period. A time limit of two minutes for each event is applied. High and low parameters are set for the total number of sit-ups and push-ups performed and are based on age and gender. The military member may perform a maximum number of 100 sit-ups and 100 push-ups. Points are based on the total number of all sit-ups and push-ups performed. Total points for this section of the PRT is limited to 200 points. Failure to meet the low parameter on either element (based on age and gender) constitutes an overall failure on the PRT. Remedial training is indicated. Remedial training includes exercise

activities three times per week for six months between failing one PRT and taking the next consecutive PRT.

The final element of the PRT is aerobic performance. The military member has the option to run/walk one and one-half miles or swims 500 yards in a specific period of time, again based on age and gender. Points are awarded based on the time needed to complete the test. Failure on the run or swim portion of the test constitutes an overall failure and the member must take part in remedial training.

Finally, there is an important and substantive matter of scoring the PRT. The final score is a composite of three of the elements, sit-ups, push-ups and the run or swim. The raw score points are transformed to standard score points. The standard score points are correlated with one of five overall scores that personnel achieve on the PRT. The overall scores are outstanding, excellent, good, satisfactory and fail. To receive a passing score, the member must achieve the minimum number of sit-ups and push-ups and meet the satisfactory requirement of time based on age and gender for the run or swim. An outstanding or excellent score on the PRT may be entered on military member's yearly evaluation and contributes to a highly competitive personnel record.

An overall goal of the PRT is to help the military member achieve minimum standards of physical conditioning and body fat composition. The military health promotion program outlines specific guidelines to achieve fitness and promote a healthy lifestyle. Administrative actions for those active duty military members who are unable to pass the PRT include several options. The remedial command-directed physical conditioning program is mandatory for those who fail any portion of the

PRT (excluding the sit-reach). Basic requirements include a mandatory exercise program designed to meet individual needs for aerobic fitness, muscle endurance and flexibility. For those who do not meet the height/weight and body fat percent standards, nutrition counseling and a personal nutrition, self-study guide is provided. The remedial program is approximately 6 months in duration or the time period between the semi-annual testing dates (Department of the Navy, 1998).

Other administrative actions include entering a mandatory Bureau of Medicine and Surgery Weight management program, reporting the failure to the Bureau of Navy Personnel for inclusion in the member's service record, delaying a promotion, and withholding advancement in rank. In other words, serious consequences may result if an active duty military member is unable to pass the physical readiness test. Consequently, it is important to determine the relationship of health promotion behaviors and cardiovascular fitness as determined by PRT performance, body fat composition, and ultimately on the success or failure of a military career.

Anterior Knee Pain

Anterior knee pain is a commonly reported complaint, yet mechanism of injury, degree of injury and appropriate treatment are still not well known. Current therapies are reportedly effective in 40-80% of persons with a primary diagnosis of anterior knee pain.

One of the problems associated with measurement of therapeutic effectiveness is the various nomenclatures for anterior knee pain. In the literature, anterior knee pain is also referred to as patellofemoral pain syndrome (PFPS), patellofermoral

arthralgia, nonarthritic anterior knee pain, overuse syndrome, runner's knee, and retropatellar pain syndrome. Although the term chondromalacia patellae was commonly used to describe the syndrome of anterior knee pain, it has recently been restricted to describe knee pain associated with soft tissue pathology and patellar articular cartilage changes (Fulkerson, 1997; Merchant, 1988). In other words, anterior knee pain is not typically associated with morphologic or pathologic changes of the patella or its supporting structures.

Anterior knee pain is functionally associated with persons who engage in vigorous physical activities, sports and exercise. It is typically associated with the following five symptoms generally obtained from a thorough patient history: (a) insidious onset, (b) dull and aching pain, (c) crepitus, (d) giving way, and (e) locking. In order to accurately diagnose AKP, all other pathologic and biomechanical etiologies must be ruled out. Patient history, physical exam and diagnostic tests including x-rays aid in the distinction of AKP from other knee disorders that share symptomatology.

Physiologically, AKP results from malalignment of the patella. When this happens, instability may occur and pain may result with overuse or stress on the joint. Although the specific etiology is unclear, it is suspected that irritation of the iliotibial band or pressure on the retinacular cartilage may occur as a result of malalignment of the patella. Soft tissue injury and/or irritation may develop around the quadriceps tendon and patellar tendon as well (Fulkerson, 1997).

The physical exam must include proper inspection and palpation of the knee. The entire range of motion must be evaluated while the patient is standing, walking

and especially while getting up from a sitting position (Fulkerson, 1997; Mehta, 1997; Papagelopoulos & Sim, 1997). The affected knee(s) need to be palpated for tenderness, crepitus, effusion and masses (Johnson, et al., 1998). Any evaluation of the knee joint must also include evaluation of the hip (Fulkerson, 1997; Mehta, 1997). Diagnostic studies include specific manipulation tests, neurovascular exam, tibial, patellar and femoral girth measurement, reflexes and x-rays, CT scan or MRI (Johnson, et al., 1998; Mehta, 1997). The patient history, complete physical exam and diagnostic tests are generally sufficient to make a diagnosis of non-operable anterior knee pain.

Appropriate treatment for AKP remains somewhat controversial. In a critical review of clinical trials on non-operative therapies for AKP, Arroll, Ellis-Pegler, Edwards and Sutcliffe (1997) identified only 5 randomized controlled trials between 1966 and 1995. Of these five studies, all treatments that were employed showed evidence of effectiveness. Eng and Pierrynowski (1993) identified that strengthening and stretching exercises and orthotics were effective in reducing pain among a group of 20 adolescent females. Finestone et al., (1993) evaluated the use of an elastic knee sleeve with a silicone patellar ring, simple sleeve or no sleeve in three groups of Israeli recruits. The 59 participants were not treated with rest or nonsteroidal anti-inflammatory drugs (NSAIDS) for the 14-week duration of the study. The findings indicated treatment without a sleeve was as useful or better than wearing an elastic sleeve and the elastic sleeve with a silicone band actually caused local skin breakdown.

Fulkerson and Folcik (1986), studied the use of two types of NSAIDS. Both types of NSAIDS tested were helpful in reducing pain, yet there was no difference in pain relief between the two types of NSAIDS.

Kannus, Natri, Nittymake, and Jarvinen, (1992) studied three groups of patients with chronic AKP who were treated with a 6-week program of quadriceps strengthening exercises, rest from activity induced knee pain and oral NSAIDS. In addition, one group received intraarticular glycosaminoglycan polysulfate (GAGPS) injections, while a second group received intraarticular saline injections and a third group served as the non-injected control group. An evaluation at six months following the treatment protocols showed that neither of the two injected groups was significantly improved on clinical assessment than the non-injection group. Two thirds of the patients in the groups who received GAGPS or saline experienced complete recovery indicating that conservative treatment was highly effective.

Raatikainen, Vaanaen, and Tamelander, (1990) evaluated the effectiveness of intramuscular (IM) glycosaminoglycan versus no treatment. The IM glycosaminoglycan group demonstrated statistically significant improvement of retropatellar cartilage upon arthroscopic exam. An important variable in this particular study is that some of the participants had morphologic changes to the retropatellar cartilage. This suggests pathological changes to the knee joint. Pathological changes in the joint are inconsistent with the diagnosis of anterior knee pain or patellofemoral pain syndrome.

In summary, the five randomized controlled studies varied in the duration of symptoms, duration of therapy, and number, age and gender of the participants. In

addition, two of the five studies included persons with cartilage damage. All of the studies strictly focused on biomedical causes and treatment for AKP.

There are many nonrandomized studies regarding non-operative therapy for AKP. Conservative treatment normally consists of rest during the acute pain phase from the activity that produced pain, NSAIDS, cold to eliminate pain and swelling, and quadriceps strengthening exercises with eventual return to normal activities.

Clinicians often vary in their treatment approach. Such methods include quadriceps strengthening exercises for a specific duration of time (Doucette & Goble, 1992; MacIntyre & Robertson, 1992; Reilly & Martens, 1972; Thomee, Grimby, Svantesson, & Osterberg, 1996), patellar taping (Doucette & Goble, 1992; Larsen, et al., 1995; Powers, et al., 1997), vastus medialis oblique muscle retraining (Doucette & Goble, 1992; Laprade, Culham, & Brouwer, 1998; Powers, Landel, & Perry, 1996; Cerny, 1995), orthotoses (Doucette & Goble; 1992; Eng & Pierrynowski, 1993; Kingman, Liaos, & Hardin, 1993), knee brace (Cherf & Paulos, 1990; Finestone, et al., 1993) and biofeedback. The treatments may be prescribed in combination, separately or consecutively if previously tried methods fail.

Among active duty military members, patellofemoral pain was reported as a common type of training injury and accounted for the second highest number of workdays lost (Jordaan & Schwellnus, 1994; Snoddy & Henderson, 1994). The two studies available were conducted during basic military training among young recruits. Jordaan and Schwellnus (1994) recommended modification of the training program and attention to bone stress injuries while Snoddy and Henderson (1994) believed that boot orthotics might reduce the incidence of injury and lost days.

A recent and very interesting study among military cadets at the Naval Academy in Annapolis, Maryland identified important gender differences related to anterior cruciate ligament (ACL) injuries (Gwinn, et al., in press). Female midshipmen were at significantly higher risk for ACL injury during intercollegiate sports and routine military training than were men. Although this retrospective study does not focus specifically on non-operable knee pain, it serves as an important finding related to gender and knee injury. Midshipmen, regardless of gender, surpass the general population on physical fitness prior to entering the academy.

Many of the studies cited above are limited by small sample size, convenience versus randomized sampling and inability to generalize to the population of persons with anterior knee pain. More importantly, it is not well understood what role health promoting behaviors play in the overall fitness and risk of injury among those persons with AKP.

Theoretical Framework: The Health Promotion Model (HPM)

The Health Promotion Model (HPM) served as the theoretical framework for this study. The author proposed that health promotion behaviors possibly play a significant role in the development of AKP and contribute to performance on the PRT.

Pender (1996) first proposed the HPM in 1987 and since that time, numerous studies have been conducted to test the relationships outlined in the model. In fact, the HPM was revised in 1996 based on research findings over the nine-year period since the first time the HPM appeared in the nursing literature.

The HPM is theoretically based on expectancy value theory and social cognitive theory. As described by Pender (1996), expectancy value theory was based on an individual's motivation to action because an expected benefit or gain, of personal value, would be achieved. Social cognitive theory represents the view that self-direction and self-efficacy are major determinants of behavior. An individual has the intellectual ability to evaluate actions that affect personal health, make decisions to engage in certain behaviors and know the consequences of chosen actions. Internal and external forces affect behavior. Self-motivation (internal force) and observation of others experiences (external force) influence decisions and actions.

The HPM was derived from these and other theoretical considerations, nursing's role in health promotion and disease prevention, and the desire to "emphasize the active role of the client in shaping and maintaining healthy behaviors and in modifying the environmental context for health behaviors" (p. 55). Pender reminds us that health is a major domain of nursing practice and that nurses are in the position to promote healthy behaviors within individual, family, community and global realms through practice and education (Pender, 1992).

As noted previously, the revised HPM has 10 major variables that represent individual characteristics and experiences, behavior-specific cognitions and affect and behavioral outcome. For the purpose of this study, seven of the 10 determinants of behavior will be evaluated. These are: (a) prior related behavior; (b) biologic and sociocultural personal factors; (c) perceived barriers to action; (d) perceived benefits of action; (e) activity-related affect; (f) situational influences; and (g) interpersonal influences.

The seven elements of the model were specifically selected to help elucidate the role of military culture and shipboard environment as potential factors in the outcome of the planned research. Figure one depicts a model of relationships based on the HPM and includes specific elements of the military culture and its population. It is suggested that the presence or absence of a personal fitness program, frequency of maintaining health promoting behaviors and demographic factors have a relationship to perceived benefits and barriers to action, emotional responses to physical activity, interpersonal factors, and situational influences of an organizational nature. Furthermore, it is suggested that all of these factors have a relationship with performance on the Navy PFT.

Conclusion

Health promotion behavior was defined as "any actions or behaviors taken by individuals to improve or promote well-being or health" (Kulbok, et al., 1997). Our nation, along with the WHO and the DoD have identified health promotion as a major social, behavioral, and global issue that calls out for a new perspective on healthy lifestyles among all people and all nations.

The military has an organizational commitment to health promotion, yet many of its members are subject to demanding work environments, high levels of stress and higher than normal standards of physical fitness. It is evident from the literature that injury and illness occur and yet, possibly, may be preventable.

Health promotion behavior, within the context of the presence or absence of AKP and among a military population, has not been the subject of previous research using a health promotion model. The etiology of AKP is unclear. After all the

questions have been asked, the physical exam is done and the x-rays fail to reveal a tangible cause of AKP, the individual is subjected to a variety of therapies that may or may not relieve the pain and allow the return to normal physical activities. It is reasonable and logical to alter the perspective from a medical model of disease to a nursing model of health promotion and examine relationships between health promoting lifestyles and anterior knee pain. It is then also reasonable to examine the relationship of health promoting behaviors, the presence or absence of AKP and the behavioral outcome of performance on the Navy PRT.

CHAPTER III

METHODOLOGY

Method

In this chapter, the method, sample population, instruments, procedures to collect the data and the data analysis plan are described. In addition, issues related to human subjects, potential risks, confidentiality, expense to subjects and limitations are outlined.

The research design is a descriptive correlational design. The purpose of this study is to examine the relationships among health promotion behaviors and performance on the Navy PRT in the presence or absence of AKP among active duty military shipboard personnel.

Sample

Subjects for this study included active duty Navy men and women who were currently serving aboard one of the Navy ships in San Diego, CA or who had served on board a Navy ship for a minimum of one year in the past three years. Subjects were at least 17 years old (age is related to eligibility to enter the U. S. Navy) and there was no upper limit on age as long as the military member was currently on active service. The sample did not include midshipmen, recruits or reservists. Efforts to obtain a representative sample based on gender, age, ethnicity, and rank was made by the researcher. If the military member met the research inclusion criteria, he or she was encouraged to participate in the study.

A preliminary power analysis using a software program called "G-Power" and based on the use of the *t*-test, identified a need for 176 subjects (Faul & Erdfelder, 1992). The alpha coefficient was set at .05 and the confidence interval was set at .95. In order to compensate for the possibility of attrition and incomplete data sets, and the desire to collect as large a sample as possible when using convenience sampling (Polit & Hungler, 1987), the number of subjects was set at 230. The sampling design was a nonprobability, convenience sample.

Subjects were recruited following personal visits to the Force Medical Officer of Naval Surface Forces, Pacific and Naval Air Forces, Pacific for San Diego based ships. The purpose of the study was explained and permission to contact the Senior Medical Officers on board one aircraft carrier and two amphibious surface ships was obtained. The researcher personally met each ship's Senior Medical Officer to explain the study and to provide a written copy of the proposal and all instruments that were used. In addition, the researcher personally visited the Commanding Officer and Executive Officer of the hospital ship USNS MERCY (T-AH 19). Following an explanation of the study, the researcher was granted permission to recruit subjects.

Subjects were recruited through the use of an announcement in the ship's Plan of the Day which is a daily notice of all ships activities. Flyers that described the purpose of the study, general inclusion and exclusion criteria, and dates when the researcher would be on board the ship were distributed to ship's Department Heads for dissemination to all personnel on board.

Subjects were also recruited from the Physical Therapy Department knee-school clinic located at Naval Hospital, San Diego. The researcher or her assistant,

met with all of the knee school students to explain the study. Eligible participants were asked to meet with the researcher or her assistant at the end of the knee class.

Subjects were all considered to be previously healthy. The non-knee pain group had no evidence of anterior knee pain or knee trauma. The knee pain group had a medical diagnosis of non-operative, chronic anterior knee pain or self-assessed diagnosis of AKP based on clinical history and symptoms of AKP. Symptoms and clinical history for AKP must have been present for at least 2 months duration and in at least one knee. Exclusion criteria included the presence of osteomyelitis, arthritis, and knee pathology from acute trauma, hemorrhage and damage to the supporting knee structures as these entities represent knee pathology that is not consistent with a diagnosis of AKP.

All participants were informed of the research intent and signed an informed consent with the knowledge that they could withdraw from the study at any time. In addition, all participants were advised that non-participation in the study would not affect their health care or military career in any way. A candy bar and pen were offered as an incentive to participate.

Instruments

A researcher-designed tool (Demographic Questionnaire) was used to collect the demographic variables such as age, gender, rank, years in service, ethnicity, marital status, and education. SES was based on identified rank, as a person's rank is highly predictive of pay status and therefore socioeconomic status. The subject was also asked about the presence or absence of knee pain.

A second researcher-developed tool (Personal Fitness Questionnaire) examined the subject's personal fitness program and the situational influences of a shipboard environment. The fitness program statements were based on physical fitness and exercise literature, the Navy's health promotion program and the shipboard environment.

The questionnaire had 3 major sections. The first and second sections were related to the presence of anterior knee pain. The subject was asked whether or not he or she had used any of the eight most commonly prescribed treatment modalities. The perception of how helpful the modalities were is captured on a 5-point Likert scale ranging from (1) not helpful to (5) quite helpful. This section was not specifically addressed in the research aims and results will be discussed under a supplemental findings section in Chapter 4. There was one question related to changes in the subject's personal fitness program since the diagnosis of AKP and a second 5-point Likert scale to indicate the degree of change in duration, frequency and intensity of how the subject's exercise program had changed. In addition, the subject was asked to indicate what type of exercise he or she was currently doing.

The third section attempted to evaluate the effect of life on board a Navy ship and its effect on maintaining a physical fitness program. Five statements, based on health promotion literature and the Navy health promotion program, required a response indicating whether or not the statement was true or false for the subject. Responses were binomial in nature and reported as percentage of responses that were yes (true) or no (false). Questions related to whether or not the subject's exercise

routine changed when deployed and where the subject exercised while deployed or in port were included. Again, frequency of responses were reported as percentages.

A third 5-point Likert scale measured the order of importance regarding shipboard factors that influenced one's exercise program. Responses included most important, very important, important, less important and not important. Results were reported as frequencies and percentage of respondents who selected each response.

Finally, the last question related to the subject's perceived current health status. The subject was asked to rate his or her health status as excellent, good, fair or poor. Overall percentage of responses were tabulated and reported.

Health promotion behaviors were examined using the Health-Promoting Lifestyle Profile, HPLP II, developed by Walker, (1996). The HPLP II is a 52-item instrument that measures frequency of performing health promotion behaviors. The instrument has six subscales: health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations and stress management. All items were scored on a 4-point response format that ranged from 1 (never) to 4 (routinely). Scores range from 52- 210 points. A higher score indicates a greater frequency of performing health-promoting behaviors.

Item analysis, reliability and validity estimates have been calculated for the entire instrument and the six subscales. Data were collected from a convenience sample of a general adult population in eastern Nebraska. Adults were recruited from corporate and industrial worksites, churches, schools and universities, nutrition sites, health fairs and senior health maintenance clinics. The sample included 217 men and 495 women ranging in age from 18 to 92 years.

Content validity was established through expert's evaluation and literature review. Construct validity was established through factor analysis; convergent validity with the Personal Lifestyle questionnaire and by a non-significant correlation with social desirability. Criterion related validity was supported by significant correlations with concurrent measures of perceived health status and quality of life. For the HPLP II, the Cronbach's alphas were: Health Responsibility (.86), Physical Activity (.85), Nutrition (.80), Spiritual Growth (.86), Interpersonal Relations (.87), and Stress Management (.79). Total HPLP II was (.94) (Walker, 1996).

Reliability for the HPLP II was reported by Fowler (1997). She examined the relationship between hope and health promotion behaviors in a group of 42 adults with Parkinson's disease. In this study, Chronbach's alpha for the HPLP was reported as .94 and for the six subscales, the range was from .80 to .92.

Perceived benefits and perceived barriers were measured using the Exercise Benefits/Barriers Scale (EBBS) developed by Sechrist (1987). The EBBS is a 43-item instrument that measures two phenomena, perceived benefits of exercise and perceived barriers to exercise. The nine factors, derived from factor analysis, explained 64.9% of the explained variance. Five factors loaded on the benefits scale. They were: (a) life enhancement, (b) physical performance, (c) psychological outlook, (d) social interaction, and (e) preventive health. The other four factors which loaded on the barriers scale were: (a) exercise milieu, (b) time expenditure, (c) physical exertion, and (d) family encouragement.

A sample of 650 healthy adults completed the instrument. Cronbach's alpha for the total instrument score was .952. The 29-item benefits scale had a Cronbach's

alpha of .866 while the 14-item barrier scale had a Cronbach's alpha of .772 (Sechrist, 1987). The instrument was evaluated for content validity by four nurse researchers familiar with health promotion literature.

A 4-point forced-choice Likert format was used. Benefits and barriers are scored as strongly agree=4, agree=3, disagree=2 and strongly disagree=1. The EBBS may be scored in its entirety as an overall score or be scored separately as a "benefits" score and a "barriers" score. In this study, scores for benefits and barriers were calculated separately for analysis. Benefits scores range from 29 to 116 and the barriers score may range from 14 to 56. The higher the score, the greater the perception of benefits of and barriers to exercise (Sechrist, 1987).

Activity related affect includes items that reflect an individual's emotional response to health promoting behaviors and was measured with the EBBS and the HPLP II subscales on stress management and spiritual growth.

Performance on the Navy PRT was determined from the most recent test completed by all subjects. The NAVPERS 6110/2 form was used as the source of data on the specific elements of the PRT including the sit-reach component, curl-ups, push-ups, 1.5 mile run and overall score. Scores were reported as a raw score and then converted to points. Both the raw score and points were recorded and analyzed. The researcher calculated each subject's BMI based on the subject's height and weight measurements as reported on the NAVPERS 6110/2.

Procedure

Following institutional approval of the dissertation proposal, the researcher began recruiting potential subjects through the methods described above. Initial

contact with the senior medical officers onboard an aircraft carrier and two large amphibious ships home-ported in southern California was made by phone and followed by a personal visit to explain the intent of the study and to provide a copy of the approved proposal and instruments. Similarly, contact was made with the Commanding Officer and Executive Officer of one hospital ship, also located in southern California.

Following their review of the proposal, and posting an announcement about the study in the Plan of the Day, the researcher went aboard the aircraft carrier and one of the amphibious ships on three separate days for approximately 3 hours per day. Inclusion and exclusion criteria were reviewed with each potential subject and those who met the criteria were given a packet that contained two consent forms, and all instruments. The study purpose was explained and informed consent was obtained. The instruments were distributed and collected by the researcher or her assistant in each setting. The time required for data collection took approximately 30-45 minutes. All subjects were given a candy bar and pen for their participation in the study. Not all persons who were approached to participate in the study did so. None of the subjects who participated in the study elected to withdraw at any point during the time the study was conducted.

The researcher went to sea with one amphibious ship and the hospital ship for three days on each ship. During this "underway" period, the researcher was located in the galley (dining hall) before and after lunch and dinner. Interested, potential subjects were able to come to the galley when they had the time. Inclusion and exclusion criteria were reviewed with each potential subject and those who met the

criteria were given a packet that contained two consent forms and all instruments. The study purpose was explained and informed consent was obtained. The instruments were distributed and collected by the researcher or her assistant in each setting. The time required for data collection took approximately 30-45 minutes. All subjects were given a candy bar and pen for their participation in the study.

The instruments were distributed in the following order: demographic questionnaire, personal fitness questionnaire, HPLP II and EBBS. PRT results were obtained from the NAVPERS 6110/2 at a later date. The researcher made a list of all personnel who participated, completed the forms and had appropriately signed the consent form. These lists were provided to a contact person on board all four ships. The PRT record was either provided to me directly or copies of the results were provided.

Data Analysis

Data analysis for each of the four specific aims was performed using the Statistical Package for the Social Sciences (SPSS) for Windows with a .05 level of probability to indicate statistical significance for all procedures. For hypothesis number one, the HPLP II was administered. The results were compared between the two groups of military members, those with and those without AKP in the following manner. Descriptive statistics were calculated, including the mean and standard deviation. The independent samples chi-square test was used to assess the relationship between the frequency of Health Promotion Behaviors and gender, age, ethnicity, marital status, education, and rank between the two groups of subjects.

Data analysis for hypothesis two included analysis of the data obtained from the NAVPERS 6110/2 form. The results of the individual elements such as the curl-ups, push-ups and run time, and the overall scores on the PRT were tabulated for the knee pain and non-knee pain groups of military members. The independent samples chi-square test was used to assess the relationship of performance on the PRT and gender, age, ethnicity, marital status, education, and rank between the two groups of subjects.

For hypothesis three, results of participation on a personal fitness questionnaire, BMI, the EBBS, and HPLP II were analyzed using the independent samples chi-square test to detect any differences between those subjects with AKP and those without AKP. Data analysis for hypothesis four included descriptive statistics to summarize and describe the demographic characteristics of the sample. The independent samples chi-square test was used to examine any differences between those subjects with AKP and those without AKP. The data were graphically displayed to identify patterns of distribution for all hypotheses.

Human Subjects

The proposal was submitted to and approved by the University of San Diego and the Naval Medical Center, San Diego, CA committees for protection of human subjects and scientific review.

Potential Risks

The potential risks of the study may have been a perception by the participants that the results may be used against the subject as justification to administratively or medically separate the individual from the military. Anonymity was assured by the

researcher and assistants and should have eliminated this perceived risk. Individuals were reminded that they could withdraw from the study at any point. The potential benefits of the study should outweigh the potential risks. The potential benefits include possible identification of health promotion behaviors that are conducive to a positive outcome on the Navy PRT and a reduced risk for developing AKP.

Confidentiality

Subjects were assured that they would remain anonymous. None of the questionnaires or surveys had any markers of the subject's identity. If the results of the study are published, the data will be reported as group data. All data were maintained in a locked file available only to the investigator and her assistant in order to safeguard the data.

Expense to the Subjects

Subjects incurred no expense. Data were collected during visits to the ships and the knee pain clinic when personnel had the time to participate.

Limitations

The following limitations have been identified for this study:

1. The sample was a convenience sample that limits generalizability of the study results.
2. The decision to allow self-diagnosis of AKP may influence the homogeneity and validity of the subjects in the AKP group. All reasonable efforts were made to ensure subjects in the AKP group met the inclusion criteria of the study.
3. AKP is one of several names given to a diagnosis of knee pain. Subjects were selected based on any one of the following diagnoses, AKP, PFPS, patellofemoral

arthralgia, nonarthritic anterior knee pain, overuse syndrome, runner's knee and retropatellar pain syndrome.

4. The PFQ was designed by the researcher and not pilot-tested for psychometrics such as reliability and validity. However, the origin of the questions used was drawn from the literature or significant experience as in the case of shipboard influences.

CHAPTER IV

RESULTS

This chapter includes the findings of the study. It is divided into three major sections. The first section consists of descriptive statistics related to the demographic nature of the sample and key variables. The second section contains descriptive and inferential analysis of the primary data. The third section is a presentation of supplemental data analyses including two linear regression models; the first is of predictor variables of performance on the PRT and the second is predictor variables on performing health promoting behaviors.

Description of the Sample

Characteristics of the Sample. Two hundred and thirty active duty military personnel participated in the study. They were personally recruited from four southern California based ships. One hundred and ninety-two subjects completed all parts of the study and served as the final sample. Thirty-eight participants failed to complete major portions of the study instruments or did not complete a PRT within the past year.

One hundred fifty-five subjects (81 %) were male and 37 (19%) were female. Age data were collected based on age groups. Six subjects (3%) were between the ages of 17-19 years. One hundred fourteen subjects (59.4%) were between the ages of 20 years and 29 years. Fifty-one subjects (26.6%) were between 30-39 years and 21 (10.9%) were between 40-49 years. No participants were 50 years or older.

Table 2

Frequency Distribution for Gender, Age, Ethnicity, Marital Status, Education, and Rank for All Subjects (n=192)

Characteristic	f	%
Gender		
Male	155	81
Female	37	19
Age		
17-19 years	6	3.1
20-29 years	114	59.4
30-39 years	51	26.6
40-49 years	21	10.9
Ethnicity		
Caucasian	103	53.6
African American	28	14.6
Hispanic American	27	14.1
Asian American	9	4.7
Native American	3	1.6
Other	19	10
Marital Status		
Married	99	51.6
Never Married	75	39.1
Divorced	18	9.4

(table continues)

Education		
High School or Equivalency	98	51
1-2 Years of College or Technical School	62	32.3
Bachelor's Degree	25	13
Postgraduate Degree	7	3.6
Rank		
Enlisted	175	91.6
Officer	16	8.4

Table 3

Frequency Distribution of Gender, Age and Ethnicity for the AKP and No-AKP Groups (n=192)

Characteristic	AKP Group (n=95)		No-AKP Group (n=97)	
	f	%	f	%
Gender				
Male	81	85.3	74	76.3
Female	14	14.7	23	23.7
Age				
17-29	57	60	63	64.9
30-39	26	27.4	25	25.8
40-49	12	12.6	9	9.3
Ethnicity				
Caucasian	58	61.1	45	46.4
African American	15	15.8	13	13.4
Hispanic American	15	15.8	12	12.4
Asian American	2	2.1	7	7.2
Native American	1	1.1	2	2.1
Other	3	3.2	16	16.5
Ethnicity by category				
White	58	61.1	45	46.4
Nonwhite	36	37.9	50	51.5

Table 4

Frequency Distribution of Marital Status and Education for the AKP and No-AKP Groups (n=192)

Characteristic	AKP Group (n=95)		No-AKP Group (n=97)	
Marital Status	f	%	f	%
Married	57	60.0	42	43.3
Never married	28	29.5	47	48 5
Divorced	10	10.5	8	8.2
Education				
High School or equivalence	39	41.1	59	60.8
1-2 years college or tech school	41	43.2	21	21.6
Bachelor's Degree	9	9.5	16	16.5
Postgraduate Degree	6	6.3	1	1.0
Education by category				
High School or equivalence	39	41.1	59	60.8
1-2 years college or tech school	41	43.2	21	21.6
BS & PG	15	15.8	17	17.5

Table 5

Frequency Distribution of Rank, Rank by Category and Time in Service for the AKP and No-AKP Groups (n=192)

Characteristic	AKP Group (n=95)		No-AKP Group (n=97)	
Rank	f	%	f	%
E-2	3	3.2	7	7.2
E-3	13	13.7	11	11.3
E-4	24	25.3	37	38.1
E-5	26	27.4	17	17.5
E-6	8	8.4	18	18.6
E-7	8	8.4	1	1.0
E-8	0	0	1	1.0
E-9	1	1.1	3	3.1
O-1	1	1.1	0	0
O-2	1	1.1	0	0
O-3	2	2.1	3	3.1
O-4	5	5.3	1	1.0
O-5	2	2.1	1	1.0
Rank by category				
E1-E4	40	42.1	55	56.7
E5-E6	34	35.8	36	37.1
E7-O5	20	21.1	6	6.2

(table continues)

Time in service by category				
1-3 years	30	31.6	50	51.5
4-10 years	29	30.5	21	21.6
>10 years	34	35.8	24	24.7

Table 6

Frequency Distribution for BMI by Category, PRT Score, PRT Score by Category and Current Health Status for the AKP and No-AKP Groups (n=192)

Characteristic	AKP Group (n=95)		No-AKP Group (n=97)	
BMI by category	f	%	f	%
23 or less	24	25.3	32	33
24-26	31	32.6	26	26.8
>26	37	38.9	28	28.9
PRT score				
Outstanding	38	40	30	30.9
Excellent	21	22.1	36	37.1
Good	16	16.8	21	21.6
Satisfactory	15	15.8	8	8.2
Pass	5	5.3	1	1
Fail	0	0	1	1
PRT score by category				
Outstanding	38	40	30	30.9
Excellent	21	22.1	36	37.1
Good	16	16.8	21	21.6
Satisfactory, Pass, & Fail	20	21.1	10	10.3

(table continues)

Current Health Status	f	%	f	%
Excellent	15	15.8	29	29.9
Good	52	54.7	51	52.6
Fair	27	28.4	15	15.5
Poor	0	0	1	1
Missing	1	1.1	0	0

Table 7

Frequency Distribution for Knee Pain Site, Diagnosis By, and Length of Time with Diagnosis for the AKP Group (n=95)

Knee Pain Site	f	%
Right knee	22	23.2
Left knee	15	15.8
Both knees	51	53.7
Diagnosis by		
Health Care Practitioner	45	47.4
Self	49	53.7
Length of time since diagnosis		
2 months-1year	33	34.7
1-2 years	20	21.7
>2 years	37	38.9

Table 8

T-Test Summary Table of Current Health Status between the AKP and No-AKP Groups

Variable	AKP Group (n=95) M	SD	No-AKP Group (n=97) M	SD	t	df	p value
Current Health Status	2.14	.66	1.89	.71	2.533	190	.012*

Note: All p values are 2-sided. *p<.05

One hundred three subjects (53.6%) were Caucasian, 28 (14.6%) were African American, 27 (14.1%) were Hispanic American, 9 (4.7%) were Asian American, 3 (1.6%) were Native American, and 19 (10%) were in the category of other. Ninety-nine (51.6%) were married, 75 (39.1%) were never married, 18 (9.4%) were divorced, and none were widowed (0%). The greatest number of participants had a high school education (n= 98, 51%), while others had some college or technical school (n= 62, 33.5%), bachelor's degree (n=25, 3.5%), and postgraduate degree (n=7, 3.6%).

The majority of subjects were enlisted (n=175, 91.6%). Officers made up 8.4% (n=16) of the sample. The mean length of time in service was 7.34 years with a range of 1 to 24 years. Table 2 provides a demographic profile of all subjects included in the study. Subjects with AKP and without AKP. Ninety- five (49.5%) subjects were those with anterior knee pain and 97 (50.5%) subjects were those without anterior knee pain. Tables three through seven provide a breakout of the two groups by demographic profile and the major study variables.

The subjects with AKP (n=95) served on board a Navy ship for a minimum of one year within the past three years. Although some had a prior history of knee trauma such as an anterior cruciate ligament tear or medial meniscus injury, the diagnosis of AKP was either medically diagnosed or in the cases when it was self-diagnosed, the researcher conducted a physical assessment of the knee and only those who met the criteria were permitted to participate in the study.

The subjects without AKP (n=97) served on board a Navy ship for a minimum of one year within the past three years. They were knee pain free and had no prior history of knee trauma.

Gender, Age and Ethnicity. Eighty-one (85.3%) of the subjects with AKP were male and 14 (14.7%) were female. Fifty-seven (60%) were between the ages of 17 and 29 years. Twenty-six (27.4%) were within the 30-39 year age group and 12 (12.6%) were between the ages of 40 and 49. No subjects were 50 years or older.

In the no AKP group, 74 (76.3%) subjects were male while 23 (23.7%) of the subjects were female. Sixty-three (64.9%) subjects were between the ages of 17 and 29 years while 25 (25.8%) subjects were between the ages of 30 and 39 years. Nine (9.3%) subjects were 40-49 years old.

Fifty-eight (61.1%) subjects in the AKP group were Caucasian, 15 (15.8%) were African American, 15 (15.8%) were Hispanic American, 2 (2.1%) were Asian American, 1 (1.1%) was Native American, and 3 (3.2%) designated themselves as "other". For purposes of analyses, ethnicity was regrouped into two categories, white and nonwhite. Fifty-eight (61.1%) of the knee pain respondents were categorized as white and 36 (37.9%) were categorized as nonwhite.

In the no AKP group, 45 (46.4%) subjects were Caucasian, 13 (13.4%) were African American, 12 (12.4%) were Hispanic American, 7 (7.2%) were Asian American, 2 (2.1%) were Native American, and 16 (16.5%) designated themselves as "other". For purposes of analyses, ethnicity was regrouped into two categories, white and nonwhite. Forty-five (46.4%) of the no knee pain respondents were categorized as white and 50 (51.5%) were categorized as nonwhite.

Marital Status and Education. In the knee pain group, 57 (60%) were married, 28 (29.5%) were never married and 10 (10.5%) were divorced. Thirty-nine (41.1%) had a high school or equivalent level of education, while 41 (43.2%) had attended 1-2 years of college or

some technical schooling. Nine (9.5%) had a bachelor's degree and 6 (6.3%) had postgraduate degrees. For purposes of analyses, the bachelor's degree subjects were combined with the postgraduate degree subjects that constituted 15 (15.8%) of the knee pain group.

In the no knee pain group, 42 (43.3%) were married, 47 (48.5.5%) were never married and 8 (8.2%) were divorced. Fifty-nine (60.8%) had a high school or equivalent level of education, while 21 (21.6%) had attended 1-2 years of college or some technical schooling. Sixteen (16.5%) had a bachelor's degree and 1 (1%) had a postgraduate degree. For purposes of analyses, the bachelor's degree subjects were combined with the postgraduate degree subjects that constituted 17 (17.5%) of the knee pain group. Table 4 shows the frequency distribution for marital status and education.

Rank and Time in Service. The majority of subjects for both groups came from the enlisted ranks of E-4 and E-5. The AKP group had 50 (52.7%) subjects in these 2 ranks while the no AKP group had 54 (55.6%) subjects in the E-4 and E-5 ranks. Once again, due to small sample size in several of the ranks, rank was reclassified in categories. In the knee pain group, the E1-E4 category had 40 (42.1%) subjects, the E5-E6 category had 34 (35.8%) subjects and E7-O5 had 20 (21.1%) subjects. In the no AKP group, there were 55 (56.7%) subjects in the E1-E4 category, 36 (37.1%) subjects in the E5-E6 category and 6 (6.2%) in the E7-O5 category. The majority of subjects in the AKP group had greater than 10 years in the service (n=34, 35.8%) while the majority of subjects in the no AKP group had just 1-3 years in the service (n=50, 51.5%). (Table 5).

BMI, PRT Scores and Current Health Status. Table 6 provides a profile of the BMI, PRT scores and health status of the two groups. The majority of subjects in the AKP group

were also in the highest (greater than 26%) category of BMI (n=37, 38>9%), while the majority of subjects in the no AKP were in the lowest BMI (23 or less) category (n=32, 33%). More subjects in the AKP group (n=38, 40%) scored outstanding on the PRT than in the no AKP group (n=30, 30.9%). However, twice as many subjects in the AKP group (n=20, 21.1%) scored in the satisfactory, pass or fail category than those subjects in the no AKP group (n=10, 10.3%). For purposes of analysis, subjects in the satisfactory, pass or fail category were combined.

Subjects in both groups most frequently defined their current health status as "good" (AKP, n=52, 54.7%; no AKP, n=51, 52.6%). The next most frequent response for the AKP group was fair health status (n=27, 28.4%) while the next most frequent response for the no AKP group was excellent health status (n=29, 29.9%).

Pain Site, Method of Diagnosis and Length of Time with Diagnosis in the AKP Group. The next three reported categories capture only the AKP group and are reported in Table 7. In response to knee pain site, the majority responded both knees (n=51, 53.7%). Forty five percent of AKP subjects (n=45) were diagnosed by a health care practitioner while 49 (53.7%) AKP subjects were self-diagnosed. The length of time since diagnoses varied tremendously and were categorized for analysis purposes. Thirty-seven (38.9%) subjects in the AKP group experienced knee pain for more than two years while 33 (34.7%) subjects had knee pain for two months to one year and 20 (21.7%) subjects had AKP for 1-2 years.

Current Health Status. All subjects were asked to rate how they perceived their current health status. In the AKP group, 15 (15.8%) rated their health status as excellent; 52 (54.7%) as good, 28 (29.5%) as fair and none rated their health status as poor. In the no-

AKP group, 29 (29.9%) rated their health status as excellent; 51 (52.6%) as good; 16 (16.5%) as fair; and 1 (1%) as poor. A t-test to determine the difference between the means of the two groups and perceived health status is displayed in Table 8.

HPLP II and EBBS Scores for Both Groups. Total HPLP II scores were inversely proportional for the two groups. The majority of AKP subjects scored lowest on the HPLP II (n=45, 47.4%) while the majority of no AKP subjects scored highest on the HPLP II (n=51, 52.6 %).

A similar finding occurred in four of the six subscales of the HPLP II. The scores for health responsibility, spiritual growth, interpersonal relations and stress management were inversely proportional between the two groups. The no-AKP subjects had a tendency to score higher on the physical activity and nutrition subscales as well. Table 9 shows the frequency distribution of the HPLP II total scores and all six subscale scores for both groups.

Both groups of subjects had similar scores for the EBBS barriers portion of this instrument (Table 10). More subjects in both groups had higher barrier scores than lower scores; however, the majority of subjects in both groups (AKP group, 36.8%; and no AKP group, 38.1%) showed a tendency to score in the moderate range.

On the other hand, the no AKP group (n=43, 44.3%) showed a greater percentage of high scores on the benefit portion of the EBBS. The knee pain group was more likely to have fewer scores in the higher range of scores on the EBBS (n=21, 22.1%). Table 10 shows the frequency distribution of EBBS scores between the two groups.

Table 9

Frequency Distribution of HPLP II Total Score and the Six Subscale Scores for the AKP and No-AKP Groups

Characteristic	AKP Group (n=95)		No-AKP Group (n=97)	
	f	%	f	%
HPLP II total score				
127 and below	45	47.4	19	19.6
128-140	39	47.1	27	27.8
>140	11	11.6	51	52.6
Health Responsibility Score				
17 and below	47	49.5	25	25.8
18-21	33	34.7	26	26.8
>21	15	15.8	46	47.4
Physical Activity score				
18 and below	45	47.4	24	24.7
19-21	27	28.4	23	23.7
>21	23	24.2	50	51.5
Nutrition score				
18 and below	35	36.8	21	21.6
19-23	39	41.1	30	30.9
>23	21	22.1	46	47.4

(table continues)

Spiritual Growth score				
24 and below	36	37.9	19	19.6
25-28	33	34.7	34	35.1
>28	26	27.4	44	45.4
Interpersonal Relations Score				
24 and below	40	42.1	24	24.7
25-28	30	31.6	33	34.0
>28	25	26.3	40	41.2
Stress Management Score				
18 and below	40	42.1	27	27.8
19-21	37	38.9	31	32.0
>21	18	18.9	39	40.2

Table 10

Frequency Distribution of EBBS Scores for the AKP and No-AKP Groups

Characteristic	AKP Group (n=95)		No-AKP Group (n=97)	
	f	%	F	%
EBBS Barriers Score				
40 and below	28	29.5	24	24.7
41-44	35	36.8	37	38.1
>44	32	33.7	36	37.1
EBBS Benefits Score				
87 or below	31	32.6	27	27.8
88-99	35	36.8	24	24.7
>100	21	22.1	43	44.3
missing	8	8.4	3	3.1

Table 11

T-Test Summary Table of Selected Study Variables and AKP (n=192)

Variable	AKP Group (n=95) M	AKP Group (n=95) SD	No-AKP Group (n=97) M	No-AKP Group (n=97) SD	t	df	p value
HPLP II total score	125.85	15.82	142.28	22.26	-5.881	190	.000**
+Health responsibility	17.91	4.40	20.94	5.12	-4.381	190	.000**
+Physical Activity	18.94	3.70	21.84	5.28	-4.396	190	.000**
+Nutrition	20.33	4.27	22.74	5.07	-3.553	190	.000**
+Spiritual Growth	25.42	4.12	27.95	4.60	-4.038	190	.000**
+Interpersonal relations	25.31	4.30	27.29	4.94	-2.949	190	.004**
+Stress Management	18.94	3.50	20.68	4.44	-3.025	190	.003*
EBBS Benefits	91.54	10.42	96.80	11.06	-3.284	179	.001*
EBBS Barriers	42.38	5.13	43.45	5.57	-1.389	190	.166

Note: All p values are 2 sided. *p<.01 **p<.000

+ denotes HPLP II subscales

A t-test was performed to examine the difference of mean scores between the two groups of subjects for the HPLP II and the EBBS and is summarized in Table 11. There were significant differences in means between the two groups of subjects for AKP and HPLP II scores (t= -5.092, p=.000) and each of the six subscales. There were also significant differences in means between the AKP groups and benefits scores (t= -3.291, p=.001), but there were no significant differences between the groups and barriers scores (t= -1.528, p=.128).

Descriptive and Inferential Analysis

Much of the data used for analysis was nominal or ordinal data and nonparametric in nature. In order to conduct inferential analysis, the data was grouped or categorized. Variables that were grouped were previously reported in Tables 3 through 7.

Chi square distribution allows the analysis of nominal data where observed frequencies are compared to the expected frequencies (Hinkle, Wiersma, & Jurs, 1998). Observed frequencies are those that the researcher obtains and expected frequencies are based on the hypotheses (Hinkle, Wiersma, & Jurs, 1998). Contingency tables were constructed based on the data required for comparison. In some instances, one or more cells of the contingency tables that were constructed for this data were empty (no subjects fit in a particular category); therefore it was likely that the data might not capture the expected variance. To avoid this potential error, data were grouped in the following manner.

The subject's rank was grouped by placing the lowest three enlisted ranks (E1-E3, n=34) together, followed by the middle three enlisted ranks (E4-E6, n=130).

There were so few senior-enlisted and officers that all were grouped together (E7-O5, n=27).

In addition, time in service was grouped as 1-3 years (n=80), 4-10 years (n=50), and greater than 10 years (n=58). Ethnicity originally had 6 groups. The Native American category included only three persons; Asian Americans included only nine persons, while the "other" category included 19 persons. In order to obtain clearer representation, the subjects were grouped as white (all Caucasians, n=103) and nonwhite (all others, n=86).

For the category education, the postgraduate group included seven subjects (3.6%) and bachelor's degree group included 25 subjects (13%). These two cells were combined into one category termed "bs & pg".

Time since diagnosed with AKP crossed a wide span of two months to 216 months (18 years). Time since diagnosis was regrouped in the categories of one year or less (n=33), one to two years (n=20), and greater than two years (n=37).

BMI had a range of 16 to 34 with a mean of 25. A BMI greater than 26 is considered over fat. BMI was categorized as those subjects with a BMI of 23 or less (n=56), those with a BMI of 24-26 (n=57), and those with a BMI greater than 26 (n=65).

Four categories were designed for the PRT scores. The categories of outstanding (n=68), excellent (n=57), and good (n=37) had a reasonable number of subjects per group. However, the satisfactory (n=23), pass (n=6), and fail (n=1) categories revealed a much lower representation of subjects. Therefore, the last three groups were combined to form the "SPF" category (n=30).

Pearson's Chi Square analysis was used to identify relationships of frequency, proportions or categories of nominal measurement. The following data were of nominal nature and therefore Pearson's Chi Square was employed to determine differences or variations between variables.

Presence of Knee Pain. When examining the dependent variable, AKP, the subject's ethnicity, education, marital status, rank, time in service and PRT score were significantly related to the presence of knee pain. There were no significant differences between the two groups on gender, age, or BMI. Whites were more likely than non-whites to experience knee pain, (x^2=3.91, *df*=2, p<.05); the higher the level of education, the more likely to have AKP (x^2=10.64, *df*=2, p=.005); non-married subjects were less likely to experience AKP (x^2=7.28, *df*=2, p=.03); E7 to O5 were more likely to have AKP (x^2=9.92, *df*=2, p=.007); and, subjects with more than 10 years in the service were more likely to have AKP (x^2=7.98, *df*=2, p=.02). The data was summarized in Table 12.

Time since diagnosis with AKP. When time with diagnosis was analyzed, statistically significant findings were noted with age (x^2=13.21, *df*=4, p=.01), and time in service (x^2=15.93, *df*=4, p=.003). Those subjects with AKP were older and had more than 10 years in the service. No differences were noted with gender, marital status, ethnicity, education, rank or BMI (Table 13).

BMI. A chi square analysis of BMI and the independent variables gender, age, ethnicity, marital status, education, rank, and time with diagnosis is reported in Table 14. Statistically significant differences were noted with gender (x^2=9.07, *df*=2,

Table 12

Between Group Differences in Distribution of Study Variables and AKP and No-AKP Groups

Variable	AKP Group %(no. of cases)	No-AKP Group %(no. of cases	p value
Gender			
Male	52.3 (81)	47.7 (74)	.144
Female	37.8 (14)	62.2 (23)	
Age			
17-29 years	47.5 (57)	52.5 (63)	.695
30-39 years	51.0 (26)	49.0 (25)	
40-49 years	57.1 (12)	42.9 (9)	
Ethnicity			
White	56.3 (58)	43.7 (45)	.048*
Nonwhite	41.9 (36)	58.1 (50)	
Marital Status			
Never married	37.3 (28)	62.7 (47)	.026*
Married	57.6 (57)	42.4 (42)	
Divorced	55.6 (10)	44.4 (8)	
Education			
High school or equivalent	39.8 (39)	60.2 (59)	.005**
1-2 yrs college or tech school	66.1 (41)	33.9 (21)	
BS & PG	46.9 (15)	53.1 (17)	

(table continues)

Rank			
E1-E4	42.1 (40)	57.9 (55)	.007**
E5-E6	48.6 (34)	51.4 (36)	
E7-O5	76.9 (20)	23.1 (6)	
Time in service			
1-3 years	37.5 (30)	62.5 (50)	.018*
4-10 years	58.0 (29)	42.0 (21)	
>10 years	58.6 (34)	41.4 (24)	
BMI			
23 or below	42.9 (24)	57.1 (32)	.269
24-26	54.4 (31)	45.6 (26)	
>26	56.9 (37)	43.1 (28)	

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.

* significant at $p < .05$ ** significant at $p < .01$

Table 13

Chi-Square Analysis of Time with Diagnosis of AKP and Selected Study Variables

Time with diagnosis of AKP	1 year or less %(no. of cases)	1-2 yrs %(no. of cases)	>2 yrs %(no. of cases)	p value
Gender				
Male	38.5 (30)	20.5 (16)	41.0 (32)	.526
Female	25.0 (3)	33.3 (4)	41.7 (5)	
Age				
17-29 years	47.2 (25)	26.4 (14)	26.4 (14)	.01*
30-39 years	26.9 (7)	11.5 (3)	61.5 (16)	
40-49 years	9.1 (1)	27.3 (3)	63.6 (7)	
Ethnicity				
White	34.5 (19)	23.6 (13)	41.8 (23)	.919
Nonwhite	38.2 (13)	20.6 (7)	41.2 (14)	
Marital Status				
Never married	44.0 (11)	20.0 (5)	36.0 (9)	.770
Married	36.4 (20)	21.8 (12)	41.8 (23)	
Divorced	20.0 (2)	30.0 (3)	50.0 (5)	
Education				
High school or equivalent	38.5 (15)	23.1 (9)	38.5 (15)	.927
1-2 yrs college or tech school	35.1 (13)	18.9 (7)	45.9 (17)	
BS & PG	35.7 (5)	28.6 (4)	35.7 (5)	

(table continues)

Rank				
E1-E4	43.2 (16)	32.4 (12)	24.3 (9)	.061
E5-E6	30.3 (10)	12.1 (4)	57.6 (19)	
E7-O5	31.6 (6)	21.1 (4)	47.4 (9)	
Time in service				
1-3 years	48.1 (13)	33.3 (9)	18.5 (5)	.003*
4-10 years	46.4 (13)	17.9 (5)	35.7 (10)	
>10 years	18.2 (6)	15.2 (5)	66.7 (22)	
BMI				
23 or below	42.9 (9)	19.0 (4)	38.1 (8)	.420
24-26	41.9 (13)	29.0 (9)	29.0 (9)	
>26	31.4 (11)	17.1 (6)	51.4 (18)	

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests

* significant at $p<.01$

Table 14

Chi-Square Analysis of BMI and Selected Study Variables

BMI	23 or less %(no. of cases)	24-26 %(no. of cases)	26 or more %(no. of cases)	p value
Gender				
Male	25.9 (38)	34.0 (50)	40.1 (59)	.011*
Female	51 4 (19)	24 3 (9)	24 3 (9)	
Age				
17-29 years	37.6 (44)	28.2 (33)	34.2 (40)	.109
30-39 years	16.3 (8)	40.8 (20)	42.9 (21)	
40-49 years	27.8 (5)	33.3 (6)	38.9 (7)	
Ethnicity				
White	29.5 (28)	41.1 (39)	29.5 (28)	.017*
Nonwhite	35.0 (28)	21.3 (17)	43.8 (35)	
Marital Status				
Never married	37.5 (27)	30.6 (22)	31.9 (23)	.533
Married	26.0 (25)	32.3 (31)	41.7 (40)	
Divorces	31.3 (5)	37.5 (6)	31.3 (5)	
Education				
High school or equivalent	34.0 (32)	30.9 (29)	35.1 (33)	.038*
1-2 yrs college or tech school	18.5 (10)	33.3 (18)	48.1 (26)	
BS & PG	46.7 (14)	33.3 (10)	20.0 (6)	

(table continues)

Rank				
1-3 years	39.0 (30)	27.3 (21)	33.8 (26)	.291
4-10 years	28.6 (14)	38.8 (19)	32.7 (16)	
> 10 years	24.1 (13)	31.5 (17)	44.4 (24)	
Time with Dx of AKP				
1 year or less	27.3 (9)	39.4 (13)	33.3 (11)	.420
1-2 years	21.1(4)	47.4 (9)	31.6 (6)	
> 2 years	22.9 (8)	25.7 (9)	51.4 (18)	

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.

*significant at $p<.05$

p=.01), ethnicity (x^2=8.19, *df*=2, p=.02), and education (x^2=9.66, *df*=4, p<,.05). Males were more likely to have higher BMI scores, nonwhites were more likely to have a BMI of 23 or less and greater than 26. A lower BMI was associated with a higher level of education.

PRT Score. Performance on the PRT was analyzed with the variables gender, age, ethnicity, marital status, education, rank, time with diagnosis, BMI and presence of AKP. Statistically significant findings were noted with rank (p=.01), education (p<.03), and BMI (p=.008). Those subjects who were higher in rank, had more education and lower BMI's scored higher on the PRT. Although statistical significance was not associated with marital status or time since diagnosis, the data suggests that those subjects who were divorced and those subjects with one year or less since diagnosis scored higher on the PRT. Though not statistically significant, there appears to be a trend that as BMI increased, more subjects were likely to score in the satisfaction, pass or fail category and fewer subjects were likely to score outstanding. (Table 15).

Two-thirds of subjects who scored in the satisfactory, pass or fail category on the PRT were more likely to have AKP (x^2=8.88, *df*=3, p=.03). The subjects most likely to score outstanding, excellent or good on the PRT were those without AKP. (Table 16).

PRT, Health Promotion Behaviors, and Exercise. There were no significant differences on performance of health promoting behaviors and scores on the PRT (p=.514). Each of the six subscales of the HPLP II was also examined in relation to

Table 15

Chi-Square Analysis of PRT Scores and Selected Study Variables

PRT Scores	Outstanding % (no. of cases)	Excellent % (no. of cases)	Good % (no. of cases)	Satisfactory, Pass, Fail % (no. of cases)	p value
Gender					
Male	35.5 (55)	31.0 (48)	18.7 (29)	14.8 (23)	.827
Female	35.1 (13)	24.3 (9)	21.6 (8)	18.9 (7)	
Age					
17-29 years	30.8 (37)	31.7 (38)	19.2 (23)	18.3 (22)	.560
30-39 years	41.2 (21)	29.4 (15)	17.6 (9)	11.8 (6)	
40-49 years	47.6 (10)	19.0 (4)	23.8 (5)	9.5 (2)	
Ethnicity					
White	34.0 (35)	28.2 (29)	21.4 (22)	16.5 (17)	.829
Nonwhite	38.4 (33)	30.2 (26)	17.4 (15)	14.0 (12)	
Marital Status					
Never married	30.7 (23)	28.0 (21)	25.3 (19)	16.0 (12)	.064
Married	33.3 (33)	34.3 (34)	17.2 (17)	15.2 (15)	
Divorces	66.7 (12)	11.1 (2)	5.6 (1)	16.7 (3)	

(table continues)

Education					
High school or equivalent	28.6 (28)	31.6 (31)	23.5 (23)	16.3 (16)	.029*
1-2 yrs college or tech school	37.1 (23)	22.6 (14)	19.4 (12)	21.0 (13)	
BS & PG	53.1 (17)	37.5 (12)	6.3 (2)	1 (3.1)	
Rank					
E1-E4	27.4 (26)	35.8 (34)	22.1 (21)	14.7 (14)	.013*
E5-E6	35.7 (25)	24.3 (17)	20.0 (14)	20.0 (14)	
E7-O5	65.4 (17)	23.1 (6)	3.8 (1)	7.7 (2)	
Time with Dx of AKP					
1 year or less	51.5 (17)	18.2 (6)	15.2 (5)	15.2 (5)	.074
1-2 years	25.0 (5)	45.0 (9)	10.0 (2)	20.0 (4)	
>2 years	35.1 (13)	13.5 (5)	21.6 (8)	29.7 (11)	
BMI					
23 or less	42.9 (24)	37.5 (21)	10.7 (6)	8.9 (5)	.056
24-26	40.4 (23)	19.3 (11)	24.6 (14)	15.8 (9)	
> 26	26.2 (17)	30.8 (20)	21.5 (14)	21.5 (14)	
Knee pain					
Yes	55.9 (38)	36.8 (21)	43.2 (16)	66.7 (20)	.031*
No	44.1 (30)	63.2 (36)	56.8 (21)	33.3 (10)	

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.

* significant at $p<.05$

Table 16

Chi-Square Analysis of PRT Scores Between Groups

Variable	AKP Group % (no. of cases)	No AKP Group % (no. of cases)	p value
PRT Scores			
Outstanding	55.9 (38)	44.1 (30)	.031*
Excellent	36.8 (21)	63.2 (36)	
Good	43.2 (16)	56.8 (21)	
SPF	66.7 (20)	33.3 (10)	

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.

* significant at $p<.05$

performance on the PRT. No significant differences were noted with health responsibility (p=.280), physical activity (p=.998), nutrition (p=.412), spiritual growth (p=.899) interpersonal relations (p=.100), or stress management (p=.629).

PRT scores were also cross-tabulated with exercise barriers and benefits. No significant differences were observed between perceived barriers to exercise and PRT scores (p=.582) or perceived benefits of exercise and PRT scores (p=.817).

AKP and Health Promotion Behaviors. Respondents without AKP scored significantly higher on the HPLP II than those respondents with AKP (x2= 38.53, *df*= 2, p<.000). In addition, the no-AKP group also scored significantly higher on all six subscales as noted in Table 17. This confirms the findings of the t-test to identify differences between the means of the two groups as noted in Table 11.

Further analyses of the HPLP II scores and the variables of age, gender, rank(SES), education, ethnicity, marital status, time in service, time since diagnosis, and BMI was performed. Statistically significant differences were noted on the variable gender. Females were more likely to demonstrate a greater frequency of health promotion behaviors than were males (x^2=19.41, *df*=2, p<.000). In addition, females were more likely to score higher on two of the six subscales; (a) physical activity (x^2=3.83, *df* = 2, p=.05) and (b) nutrition (x^2=7.41, *df* =2 p=.025).

The only other variable with a statistically significant finding was between BMI and spiritual growth, one of the six subscales on the HPLP II. In other words, the higher the BMI, the lower the spiritual growth score or frequency of spiritual growth behaviors (x^2=9.5, *df*=4, p=.05).

AKP and Barriers to Benefits of Exercise. The Exercise Barriers and Benefits Scale (EBBS) measured the subject's attitude toward exercise. As the subject's score increased, there is a greater perception of the benefits, or barriers, to exercise. There were no significant differences between subjects with AKP and those without AKP on the barriers scale. However, there was a positive, linear statistically significant difference between the groups on benefits of exercise (x^2=7.03, *df*=2, p=.008). Those without AKP scored higher on the benefits scale representing a perception of the benefits of exercise (Table 18).

Further analysis of the EBBS scores and the variables of age, gender, rank(SES), education, ethnicity, marital status, time in service, time since diagnosis, and BMI revealed only two significant results. Ethnicity and barriers to exercise were statistically significant (x^2=6.07, *df*=2, p<.05). Nonwhite subjects had higher scores on the barriers-to-exercise portion of the EBBS and therefore perceived more barriers to exercise than did white subjects. Likewise, white subjects had higher scores on the benefits-of-exercise portion of the EBBS and therefore perceived more benefits to exercise than did nonwhite subjects.

Personal Fitness Program, BMI, Perceived Benefits of and Barriers to Exercise and Health Promotion Behaviors. Pearson's chi square analysis was used to explore the relationships of a personal fitness program to BMI, perceived benefits of and barriers to exercise, and the frequency of health promotion behaviors. Only subjects in the anterior knee pain group responded to the question about whether or not their personal fitness program had changed since the onset of AKP. Sixty two percent of

the respondents indicated their personal fitness program had changed and 38% had not changed their workout program.

Table 19 demonstrates that there were no significant differences between the two groups of AKP subjects when personal fitness program was analyzed with BMI, exercise barriers or benefits or total score on the frequency of health promotion behaviors or the six subscales. In other words, those who changed their personal fitness program scored no better on the EBBS, HPLP II or demonstrated a difference in BMI.

Subjects who changed their personal fitness program (n=67, 62%), were asked to describe how the program changed based on three responses; (a) workouts take longer, (b) workouts are more intense, (c) workouts are more frequent. No significant differences were noted on duration, intensity or frequency as shown in Table 20. However, on further analysis, those subjects who worked out longer were more likely to have higher scores on the HPLP II and therefore had a higher frequency of health promotion behaviors (x^2=6.17, *df*=2, p=<.05). In addition, those subjects who rated their health status higher were more likely to have higher scores on the benefits of exercise scale (x^2=13.09, *df*=4, p=.01).

The exercise elements related to the subjects' personal fitness program were cross-tabulated with the presence or absence of AKP, PRT scores, current health status, the EBBS and HPLP II. Subjects without knee pain were more likely to exercise three times per week (x^2=3.87, *df*=1, p= 03), and were more likely to know their target heart rate (x^2=3.50, *df*=1, p=.04). Subjects who were not likely to perform warm up exercises actually scored better on the PRT than those who do routinely

perform warm up exercises (x^2=8.22, *df*=3, p=.04). Those subjects who scored higher on the benefits-of-exercise scale were more likely to exercise three times per week (x^2=13.82, *df*=2, p=.001), perform warm up exercises (x^2=11.90, *df*=2, p=.003) and cool down exercises (x^2=9.51, *df*=2, p=.009). In addition, those subjects who exercised at least three times a week for 40 minutes were more likely to score higher on the barriers-to-exercise scale which may indicate how difficult it is to maintain a workout routine (x^2=10.43, *df*=2, p=.005). The subjects who perceived their current health status as excellent or good also perceived more benefits to exercise (x^2=12.65, *df*=4, p=.013).

There were a number of statistically significant relationships between the five elements of exercise behavior and the HPLP II total score and subscale scores. These may be viewed in Table 21. This would seem to make sense as the HPLP II was designed to reflect health promoting behaviors such as exercising three times a week, performing warm up and cool down exercises and knowing one's target heart rate. There was no relationship between current health status and the five elements of exercise.

Data Analysis Related to Research Hypotheses

Hypotheses 1: There is no difference in the frequency of health promotion behaviors between active duty shipboard personnel who do not have AKP and those who do have AKP. Hypothesis one is rejected.

Table 17 illustrates statistically significant differences between the AKP and no-AKP groups on the frequency of health promotion behaviors total score (p=.000)

Table 17

Between Group Differences in Distribution of AKP and HPLP II Scores

Variable	AKP Group % (no. of cases)	No-AKP Group % (no. of cases)	p value
HPLP II Total Score			
127 and below	70.3 (45)	29.7 (19)	.000***
128-140	59.1 (39)	40.9 (27)	
141 and above	17.7 (11)	82.3 (51)	
Health Responsibility Score			
17 and below	65.3 (47)	34.7 (25)	.000***
18-21	55.9 (33)	44.1 (26)	
22 and above	24.6 (15)	75.4 (46)	
Physical Activity Score			
18 and below	65.2 (45)	34.8 (24)	.000***
19-21	54.0 (27)	46.0 (23)	
22 and above	31.5 (23)	68.5 (50)	
Nutrition Score			
18 and below	62.5 (35)	37.5 (21)	.001**
19-23	56.5 (39)	43.5 (30)	
24 and above	31.3 (21)	68.7 (46)	
Spiritual Growth Score			
24 and below	65.5 (36)	34.5 (19)	.002**
25-28	49.3 (33)	50.7 (34)	
29 and above	37.1 (26)	62.9 (44)	

Interpersonal Relations Score			
24 and below	62.5 (40)	37.5 (24)	.006**
25-28	47.6 (30)	52.4 (33)	
29 and above	38.5 (25)	61.5 (40)	
Stress Management Score			
18 and below	59.7 (40)	40.3 (27)	.002**
19-21	54.4 (37)	45.6 (31)	
22 and above	31.6 (18)	68.4 (39)	

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.

** significant at $p<.01$ *** significant at $p<.001$

Table 18

Between Group Differences on Distribution of EBBS Scores

Variable	AKP Group % (no. of cases)	No-AKP group % (no. of cases)	p value
EBBS Benefits Score			
87 and below	53.4 (31)	46.6 (27)	.008*
88-99	59.3 (35)	40.7 (24)	
100 and above	32.8 (21)	67.2 (43)	
EBBS Barriers Score			
40 and below	53.8 (28)	46.2 (24)	.749
41-44	48.6 (35)	51.4 (37)	
45 and above	47.1 (32)	52.9 (36)	

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.

* significant at $p<.01$

Table 19

Between Group Differences in Distribution of Personal Fitness Program with BMI, EBBS, and HPLP II

Change in Personal Fitness Program	YES % (no. of cases)	NO % (no. of cases)	p value
BMI			
23 or below	69.6 (16)	30.4 (7)	279
24-26	69.2 (18)	30.8 (8)	
> 26	52.6 (20)	47.4 (18)	
EBBS Barriers			
40 or below	58.3 (14)	41.7 (10)	.853
41-44	61.5 (24)	38.5 (15)	
> 44	65.6 (21)	34.4 (11)	
EBBS Benefits			
87 or below	58.1 (18)	41.9 (13)	.368
88-99	74.1 (20)	25.9 (7)	
> 100	58.8 (20)	41.2 (14)	
HPLP II total score*			
127 or below	56.3 (18)	43.8 (14)	.524
128-140	60.6 (20)	39.4 (13)	
> 140	70.0 (21)	30.0 (9)	

Note. All p values are 2 sided. P values ere derived from Pearson Chi-Square tests.

* There were no statistically significant findings with the six subscales of the HPLP II and a change in personal fitness program.

Table 20

Chi Square Analysis of Differences Between Selected Study Variables and Change in Personal Fitness Program

Variable	YES % (no. of cases)	NO % (no. of cases)	p value
Workouts more frequent			
All likely responses	56.7 (17)	43.3 (13)	1.000
Not likely responses	58.3 (21)	41.7 (15)	
(n=66)			
Workouts more intense			
All likely responses	56.3 (18)	43.8 (14)	.622
Not likely responses	63.9 (23)	36.1 (13)	
(n=68)			
Workouts take longer			
All likely responses	25.0 (8)	75.0 (24)	.789
Not likely responses	28.6 (10)	71.4 (25)	
(n=67)			

	HPLP II Total Score			
Variable	127 and below % (no. of cases)	128-140 % (no. of cases)	>140 % (no. of cases	p value
Workouts take longer				
All likely responses	80.0 (16)	56.0 (14)	86.4 (19)	.046*
Not likely responses	20.0 (4)	44.0 (11)	13.6 (3)	
(n=67)				

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.
* significant at $p<.05$

Table 21

Chi Square Analysis of Differences between Exercise Behaviors and HPLP II and Six Subscales

Exercise Variable	HPLP II Total	Health Responsibility	Physical Activity	Nutrition	Spiritual Growth	Interpersonal Relations	Stress Management
Three times/week for 40 minutes	.002**	.087	.000***	.001**	.102	.02*	.02*
Know target heart rate	.000***	.02*	.004**	.002**	.02*	.419	.005**
Maintain target HR for 20 minutes	.000***	.007**	.000***	.013*	.031*	.397	.009**
Perform warm up exercises	.001**	.016*	.000***	.000***	.001**	.005**	.001**
Perform cool down exercises	.000***	.000***	.000***	.000***	.000***	.001**	.000***

N=192

* significant at p<.05 ** significant at p<.01 ***significant at p<.001

and all six subscales. The subjects in the no-AKP group consistently scored higher on the frequency of performing health promotion behaviors.

When evaluating only those subjects with AKP, there was no significant difference between those who did and those who did not make changes in their personal fitness program (p=.524). In other words, there is no supportive evidence that those who modified their PFP performed health promoting behaviors more often than those who did not.

Those subjects with AKP who changed their PFP and showed a tendency to workout longer were more likely to score higher on the HPLP II total score (p=.046). This finding represents evidence that those with knee pain and who workout longer performed health promoting behaviors more frequently.

Although unable to perform statistical analysis between the two groups of subjects on the variables of exercise behaviors and the HPLP II scores, Table 21 suggests that those persons who were more likely to be familiar with and perform the well-established pre- and post-exercise behaviors were also more likely to demonstrate a greater frequency of performing health promotion behaviors. The evidence suggests that there is a positive relationship between exercising three times per week for 40 minutes, knowing and maintaining one's target heart rate and performing warm-up and cool down exercises leads to a greater tendency to take responsibility for one's health, be physically active, eat properly, seek spiritual support, enhance relationships and manage stress appropriately.

Hypothesis 2: There is no difference in Navy PRT scores between active duty personnel with and without AKP. Based on the findings, hypothesis two is rejected.

There are differences on PRT scores between the two groups of subjects (Tables 15 and 16). However, the findings do not suggest a relationship that would demonstrate that AKP is either predictive of PRT scores or a causative factor on PRT score outcome. Indeed, when a Pearson product moment correlation test was performed on the variables of AKP and PRT score, the result was an insignificant negative correlation (r=-.032).

Those persons with AKP were more likely to score in the highest category, outstanding, and in the lowest category, satisfactory, poor or fail. Those persons without AKP were more likely to score in the categories of excellent or good (Table 16).

However, a statistically significant difference on education and PRT score and rank and PRT score was observed. Those subjects of higher rank and more education were more likely to score outstanding or excellent on the PRT and less likely to score satisfactory, poor or fail on the PRT. Although BMI was not statistically significant (p=.056), the trend suggests that those subjects with higher BMI's were more likely to score in the lowest category of satisfactory, poor or fail.

Hypothesis 3: There is no difference between active duty shipboard personnel with and without knee pain on participation in a routine personal fitness program, BMI, perceived benefits of or barriers to exercise, frequency of health promotion behaviors and perceived health status. The variables and findings for this hypothesis will be discussed separately.

When comparing a change in personal fitness program to BMI (p=.279), benefits of exercise (p=.368), barriers to exercise (p=.853), or HPLP II scores

(p=.524), there were no statistically significant differences. See Table 19. However, table 20 shows results that suggests those persons with AKP who workout longer seem to practice more health promoting behaviors as evidenced by higher scores on the HPLP II (p=.046).

There was no statistically significant difference between the AKP and no-AKP group on BMI (p=.269). However, there were statistically significant differences between gender and BMI (p=.011), ethnicity and BMI (p=.017), and education and BMI (p=.038). Subjects who were male and nonwhite were more likely to have BMI's greater than 26. Those subjects with a bachelor's degree or postgraduate degree were more likely to have BMI's less than 26 (Table 14).

Table 18 shows the between group difference on benefits and barriers scores. Subjects without AKP were more likely to perceive greater benefits to exercise (p=.008). There were no statistically significant differences between groups on barriers to exercise.

Table 17 demonstrates between group differences on the HPLP total score and six subscales. Subjects without AKP consistently scored higher on the HPLP total score (p=.000), health responsibility (p=.000), physical activity (p=.000), nutrition (p=.001), spiritual growth (p=.002), interpersonal relations (p=.006), and stress management (p=.002). This finding suggests that those subjects without AKP perform more health promoting activities than those subjects with AKP.

There were a number of statistically significant results between perceived health status and study variables. A t-test to examine the differences of the means between the two groups was performed and found to be statistically significant (Table

8). Subjects without AKP were more likely to perceive their health as excellent while those with AKP were more likely to perceive their health as fair or poor (x^2=7.25, *df*=2, p=.027). Those persons of higher rank were more likely to have a higher perception of health status (x^2=10.24, *df*=4, p=.036).

When perceived health status was cross-tabulated with the EBBS and HPLP II, statistically significant findings were noted with barriers to (x^2=13.81, *df*=4, p=.008) and benefits of exercise (x^2=13.43, *df*=4, p=.009), the HPLP II total score (x^2=30.70, *df*=4, p=.000) and four of the six subscales; physical activity (x^2=36.54, *df*=6, p=.000), nutrition (x^2=20.02, *df*=6, p=.002), spiritual growth (x^2=29.05, *df*=4, p=.000) and stress management (x^2=18.84, *df*=4, p=.001). Those persons with higher perceived health status were more likely to perceive more benefits of exercise, fewer barriers to exercise, and higher HPLP II scores. Only the subscales of health responsibility and interpersonal relations showed no statistical significance.

Hypothesis 4: There is no difference between the two groups of active duty military personnel with or without AKP on the basis of gender, age, ethnicity, marital status, education, rank (SES), or time in service. Statistically significant results were found with ethnicity (p=.048), marital status (p=.026), education (p=.005), rank or SES (p=.007), and time in service (p=.018). No statistically significant findings were noted with gender or age (Table 12). The AKP group tended to be white, married, with more formal education, predominantly in the E7-O5 rank (and therefore had higher SES), and had more years in the service.

Presentation of Results from Supplemental Data Analysis

In order to examine: (a) treatments used by the AKP subjects, (b) changes in the AKP subject's PFP, (c) shipboard influences on exercise behavior, (d) relationship between responses on the EBBS and HPLP II, and, (e) predictors of PRT score and predictors of performing HPB, further data analyses were performed.

Treatments employed for AKP. Of the eight most commonly prescribed treatments prescribed for relief of AKP, subjects with knee pain were asked which treatment(s) they used to relieve the discomfort and to rate the level of effectiveness. Not all knee pain subjects were prescribed or had tried each of the eight treatments. For the purposes of reporting the results, the four responses that referred to a positive (or helpful) outcome when any of the treatments were used, were combined into one category that indicated helpfulness. Only one response offered an option of the treatment being of no help. It was calculated and reported with its own frequency of response by subjects.

Of those who responded, rest was the most frequently employed (57%), followed by modification of activity (54%), anti-inflammatory drugs (50%), quadriceps strengthening exercises (34%) elastic knee support (33%), hamstring and iliotibial band stretching (22%), orthotics (10%), and patellar taping (6%). Subjects employed the use of at least one of these treatments. Overall, 90% of subjects who used rest as a treatment for their AKP, found rest to be somewhat to very helpful, while 10% did not find rest to be at all helpful. Use of knee support/brace was the second highest in helpfulness and rated somewhat to very helpful by 87% of those subjects who used a knee support/brace as a treatment for

Table 22

Frequency Distribution of Treatments Used and Level of Effectiveness

Treatment	Level of Effectiveness				
	NH	SH	H	QH	VH
	n %	n %	n %	n %	n %
Rest	7(10%)	22(31%)	26(37%)	6(9%)	9(13%)
(n=70)					
Knee support/brace	5(12%)	13(32%)	10(25%)	7(17%)	5(12%)
(n=40)					
Activity Modification	10(15%)	26(39%)	18(27%)	5(7%)	8(12%)
(n=80)					
NSAIDS	11(19%)	19(33%)	16(28%)	7(12%)	5(9%)
(n=58)					
Quadriceps Exercise	10(23%)	12(28%)	14(33%)	2(5%)	5(12%)
(n=43)					
Hamstring/ Iliotibial Exercise	8(28%)	9(31%)	8(28%)	1(3%)	3(10%)
(n=29)					
Orthotics	2(20%)	3(30%)	3(30%)	1(10%)	1(10%)
(n=10)					
Patellar taping	2(20%)	4(40%)	4(40%)	---	---
(n=10)					

Legend: NH=not helpful; SH=somewhat helpful; H=helpful; QH=quite helpful; VH=very helpful

Table 23

Frequency Distribution of Change in Personal Fitness Program among Subjects with AKP

Characteristic	f	%
Change in fitness program since onset of AKP		
Yes	59	62.1
No	36	37.9
n=95		
Workouts take longer	49	73.1
n=59		
Workouts more frequent	28	42.4
n=59		
Workouts more intense	27	39.7
n=59		
Change in primary form of exercise		
Yes	13	13.7
No	27	28.4
n=95, (missing, n=55)		
Routine changes when deployed		
Yes	160	83.3
No	30	15.6
n=190, (missing, n=2)		

AKP. The third most helpful treatment identified by those who used it, was activity modification (85%) followed by NSAIDS (81%), orthotics and patellar taping (80%), quadriceps exercise (77%), and finally, hamstring or iliotibial exercises (72%). Specific responses on the degree of helpfulness scale are noted in Table 22.

Change in personal Fitness Programs Program (PFP) among AKP Subjects. Subjects were also queried about whether or not their personal fitness program had changed since the onset of AKP. Thirty-eight percent said no while the remaining 62% said yes. When asked how their exercise program had changed, subjects responded with "workout takes longer" (73%, n=49), "workout is more intense" (39.7%, n=27), and "I workout more frequently" (42.4%, n=28). Finally, the knee pain subjects were asked if they had to change their primary form of exercise since developing AKP. Of the 95 potential responses from the AKP group, 13 (13.7%) responded that they had changed their primary form of exercise while 27 (28.4%) said they did not have to change their primary form of exercise. Fifty-five subjects did not respond. Table 23 profiles responses to a change in the subject's personal fitness program.

Exercise and the Shipboard Influence

All participants were asked to indicate (through a true or false response) whether or not they routinely performed several important exercise elements in relation to their personal fitness. Sixty-one percent (n=117) of all subjects reported that they exercised at least three times a week for 40 minutes each time. Thirty-seven percent (n=72) of subjects knew their target heart rate and 42% (n=80) tried to maintain aerobic exercise at their target heart rate for 20 minutes. It is interesting to

note that while 42% of the subjects tried to maintain their target heart rate during exercise, only 37.5% knew their target heart rate.

When asked about performing "warm-up" and "cool-down" exercises before and after their workout, 82% responded that they did warm-up exercises and 62% said they did cool-down exercises. The frequency distributions for these five elements are listed in Table 24.

When asked if their exercise routine changed while underway (or deployed), 84% responded yes and 16% responded no. In addition, subjects were asked to identify the most frequently used sites where they would exercise while onboard the ship and while in port. Of a possible 7 responses for places to exercise while underway, the two most frequently used spaces were the ship's gym (78.6%, n=151) and anywhere on the ship (5.7%, n=11). While in port, subjects were more likely to use a fitness center on the Navy base (45%, n=86), or exercise outdoors and off the base (19.8%, n=38). See tables 25 and 26 for a comparison of where personnel prefer to exercise while at sea or in port.

In response to a question related to factors most important about exercising on a ship, the subjects rated time as most important or very important (77%). This was followed by the size/space of exercise room/gym (65%), access to equipment (63%), being outside in the open air (45%), and the steel deck surface (16%). Table 27 depicts the results.

Chi square analyses were performed on the shipboard environmental influences and the presence or absence of AKP, BMI, PRT scores, and exercise

Table 24

Frequency Distribution of Exercise Behaviors

Exercise Behavior	f	%
Three times/week for 40 minutes	117	60.9
Know target heart rate	72	37.5
Maintain aerobic exercise at target heart rate for 20 minutes	80	41 7
Perform warm-up exercises routinely	156	81.3
Perform cool-down exercises routinely	120	62.5

N=192

Note. There were three missing responses for times per week, four missing responses for both of the target heart rate responses, and two missing responses for warm-up and cool-down responses.

Table 25

Frequency Distribution of Exercise Sites at Sea

Characteristic	f	%
Ship's gym	151	78.6
Anywhere on the ship	11	5.7
During a port visit	8	4 2
Hanger deck	5	2.6
Flight deck	4	2.1
Forcastle	1	.5

Note: missing 7 responses, n=185

Table 26

Frequency Distribution of Exercise Sites in Port

Characteristic	f	%
Fitness center on base	86	44.8
Outdoors off base	38	19.8
Fitness center off base	21	10.9
Outdoors on base	19	9.9
Ship's gym	18	9.4
Other	6	3.1

Note: missing 4 responses, n=188

Table 27

Frequency Distribution of Most Important Factor when Exercising on Ship

Characteristic	f	%
Time	155	76.7
Size/space of exercise room/gym	122	64.6
Access to equipment	118	62.8
Being outside in the open air	85	45.2
Steel deck surface	29	15.6

Note: missing 4 responses, n=188

Table 28

Chi Square Analysis of the HPLP II and the EBBS

Variable	Exercise Benefits p value	Exercise Barriers p value
HPLP II total score	.000**	.003*
Health Responsibility	.000**	.107
Physical Activity	.000**	.000**
Nutrition	.000**	.001*
Spiritual Growth	.002*	.000**
Interpersonal Relations	.004*	.259
Stress Management	.000**	.001*

N=192

Note. All p values are 2 sided. P values were derived from Pearson Chi-Square tests.

* significant at p<.01 ** significant at p<.001

barriers and benefits and HPLP II. No statistically significant differences were noted between shipboard influences and knee pain, BMI or PRT. However, benefits of exercise were significantly related to having the time (x^2=6.11, *df*=2, p<.05) and gym space (x^2=15.65, *df*=2, p<.000) to workout. Those who rated access to equipment as important demonstrated a statistically significant higher score on the PRT (x^2=8.22, *df*=2, p<.02).

Table 28 depicts a chi-square analysis of the HPLP II, its six subscales, and the EBBS. There was a significant positive relationship between exercise benefits and the HPLP II scales. Those subjects who scored high on frequency of health promotion behaviors also scored high on the perceived benefits of exercise. There were also significant findings between exercise barriers and the HLPL II total score (p= 003), and the subscales of physical activity (p<.000), nutrition (p=.003), spiritual growth (p< 000), and stress management (p=.001). In other words, those subjects who perceived more barriers to exercise had an overall higher frequency of health promotion behaviors.

Linear Regression of PRT Score. In order to determine the variance in PRT scores, linear regression analysis was conducted. PRT score served as the criterion variable and age, gender, rank (SES), marital status, education, ethnicity, time in service, presence or absence of knee pain, knee pain site, time with diagnosis, change in personal fitness program, health status, health promotion total score and EBBS scores were the predictor variables. The model would not accept the variable presence or absence of knee pain as there was no evidence of correlation between knee pain and PRT score (r= -.035).

First, all predictor variables were entered into the linear regression model. Predictor variables were then removed one by one until a significance of <.05 was achieved on remaining variables. In this model, (Table 29), age, time since diagnosis, and BMI contributed to 21% of the variance (R square =.210). Although gender did not achieve a p-value of less than .05, the finding may represent a trend toward gender as a predictor of PRT score. Seventy nine percent of variation or predictability of PRT score is due to something other than the variables used in this study or the manner in which they were incorporated into the study.

Linear Regression or HPB. In a second model, (Table 30), the frequency of performing health promotion behaviors served as the criterion variable. All of the variables above, including PRT scores, were entered into the linear regression analysis. The presence of knee pain, knee pain site, health status and change in personal fitness program contributed to 42% of the variance (R square=.418). Fifty eight percent of variation or predictability on HPLP II scores is due to something other than the variables used in this study or the manner in which they were incorporated into the study.

Table 29

Regression of Age, Gender, Time with Diagnosis of AKP, and BMI on PRT Scores

Multiple R = 0.459		df	F	p
R Square = 0.210	Regression	4	5.462	0.001
	Residual	82		

Variable	B	SE	Beta	P
Age	-.586	.181	-.341	.002**
Gender	.648	.353	.188	.070
Time with Dx of AKP	.374	.141	.278	.009**
BMI	.382	.154	.252	.015*

* significant at p<.05 ** significant at p<.001

Table 30

Regression of Presence of AKP, Pain Site, Perceived Health Status and Change in Personal Fitness Program (PFP) on Frequency of Performing Health Promotion Behaviors

Multiple R = 0.646		df	F	p
R Square = 0.418	Regression	5	12.330	0.000
	Residual	86		

Variable	B	SE	Beta	P
Presence of AKP	1.007	.250	.611	.000**
Pain Site	-.247	.114	-.325	.034*
Perceived Health Status	-.480	.105	-.390	.000**
Change in PFP	-.299	.144	-.175	,040*

* significant at p< .05 ** significant at p<.001

Summary

This chapter presented the results of the data analysis. First a description of the sample was provided. Second, inferential statistics related to the sample and the study variables were presented. Third, data analysis related to each of the research hypothesis was presented. Finally, supplemental data analyses were provided on several variables of interest to the researcher related to treatments for AKP, the participant's personal fitness program, shipboard influences on exercise, relationship between the HPLP II and the EBBS, and possible predictors of PRT and HPB performance.

CHAPTER V

SUMMARY, DISCUSSION, IMPLICATIONS FOR NURSING AND CONCLUSIONS

In this chapter, a summary of the research design and method are discussed including the purpose, conceptual framework, data collection with analyses, and a summary of the overall study results. This is followed by a discussion of the findings related to the hypotheses and additional analysis of data regarding shipboard influences and personal fitness. Implications for nursing are discussed in the next section and lastly, conclusions of the research are presented.

Summary of Research Design and Method

The purpose of this descriptive study was to identify the relationship between health promoting behaviors and performance on the Navy PRT in two groups of shipboard personnel, those with AKP and those without AKP. Pender's health promotion model served as the conceptual framework. The model suggests that individual characteristics, prior health promoting behaviors, perceived benefits and barriers to exercise, affect and the shipboard environment are related to performance on the PFT. In this study, the individual's personal fitness program, biologic and sociocultural factors such as age, gender, ethnicity, and BMI and personal health promoting behaviors and the relationship of these variables to exercise behaviors, shipboard influences and subsets of health promoting behaviors were examined.

Subsequently, the relationship of all of the aforementioned variables to the behavioral outcome, performance on the PRT, was explored.

The following research hypotheses were addressed:

1. There is no difference in the frequency of health promotion behaviors between active duty military shipboard personnel who do not have AKP and those who do have AKP.

2. There is no difference in Navy PRT scores between active duty shipboard personnel with or without AKP.

3. There is no difference between active duty military shipboard personnel with or without AKP on participation in a routine personal fitness program, BMI, perceived barriers to exercise, perceived benefits of exercise of exercise, frequency of health promotion behaviors, and perceived health status.

4. There is no difference between the two groups of active duty military personnel with or without AKP on the basis of gender, age, ethnicity, marital status, education, rank (SES) or time in service.

Data analysis for each of the hypotheses was performed using SPSS for Windows. Data were collected from active duty personnel onboard four Navy ships in southern California. Data collection took approximately three months. Descriptive statistics were used to describe and compare demographic and study variables. Inferential statistics were used to compare the study variables between groups and to examine predictor variables for the outcome measures of performance on the PRT and frequency of use of health promoting behaviors.

Results indicated that; (a) subjects without AKP performed more health promoting behaviors, (b) there were differences in scores on the PRT between the two groups, (c) health status was rated higher by subjects without AKP, (d) time and access to exercise equipment were considered very important factors to shipboard personnel while deployed, (e) ethnicity, marital status, education, rank (SES) and time in service were associated with the presence of AKP, and (f) age, gender, time with diagnosis of AKP, and BMI were predictors of PRT outcome scores. Discussion of the results is presented in the next section.

Discussion

One hundred and ninety-two military personnel participated in this study. Eighty-one percent were male and 19% were female. One hundred seventy-five (91.6%) were enlisted and 16 (8.4%) were officers. This was reasonably consistent with the distribution of men and women in the Navy and proportion of officer to enlisted personnel. Eighty-six percent of military personnel are male and 13.7 percent are female, while 83 % of active duty members are enlisted and 17% are officers (U. S. Navy, 2000). This distribution of active duty personnel by gender and rank was similar to previous studies on health promotion (DoD, 1998; Trent & Hurtado, 1998).

At the time of data collection, three of the four ships had women aboard who participated in the study. One amphibious ship was undergoing renovation to accommodate women at a future date. There are no previous studies that examine the relationship between shipboard personnel and the variables AKP and health promotion behavior.

The ethnic distribution of the sample in this study was reasonably diverse with less than 50% of subjects categorized as white. Fifty-one and a half percent were classified as nonwhite. The DoD (1998) study had a 64.5/45.5 percent split on white/nonwhite status, while the study by Trent and Hurtado (1998) had an 83/16 percent split of white/nonwhite status.

Of those examined, no studies on AKP reported incidence of race, which may reflect an underlying premise that race is not a factor related to AKP or it was not a variable under study. In this study, more whites than nonwhites experienced AKP ($p=.048$), and nonwhites were more likely to have either BMI's of 23 or less and greater than 26 ($p=.017$). Race seemed to serve as a consistent demographic variable of interest in health promotion studies (Duffy, 1988; Felton & Parsons, 1994; Felton, Parsons, & Bartoces, 1997; Felton, Parsons, Misener, & Oldaker, 1997; Lusk, Kerr and Ronis, 1995; Pender, Walker, Sechrist, & Frank-Stromborg, 1990; Simmons, 1993) with a range of 6.5 % to 54% of subjects categorized as nonwhite.

Marital status was not cited in either the AKP or health promotion literature with any consistency. In this study, there was a relationship between marital status and the presence of knee pain. There was a statistically significant difference between AKP subjects who were married or divorced ($p=.026$). The inference suggested that if one does not marry, the subject would not likely experience AKP. This finding may be coincidental and would require further exploration to determine reliability and validity.

Education is frequently a variable of interest in the health promotion literature and was a statistically significant finding in this study. Subjects without AKP were

more likely to have a higher level of education (p=.005), have a lower BMI (p=.038) and have higher scores on the PRT (p=.029). Similar findings were noted in the studies by Kelley (2000), Lusk, Kerr, & Ronis (1995), Simmons (1993), Trent & Hurtado (1998), and the DoD study (1998).

In this study, SES was represented by the subject's rank. SES is a commonly cited variable in health promotion studies and cited as an important determinant of healthy behavior (Palank, 1991; Simmons, 1993; Williams, Lavizzo-Mourey, & Warren, 1994). The majority of AKP and no-AKP subjects were from the lowest ranks of E1-E4. However, when the two groups were compared, a statistically significant difference among ranks was evident. Those subjects in the highest rank category were more likely to have AKP (p=.007). Interestingly, the higher the subject's rank, the more likely they were to score in the higher categories on the PRT (p=.013) and the less likely they were to score in the lowest category of PRT score. This finding may be confounded by the way rank was categorized. Officer ranks were combined with senior enlisted ranks. Some of the officers were also young (20-35) and this may have skewed the PRT score finding as well as the incidence of AKP. Further studies may present a clearer representation of rank (SES) and age.

Subjects with anterior knee pain represented 49.5% of the total number of participants in this study. Slightly over half of AKP subjects (53.7%) were self-diagnosed. Efforts to control accuracy of the diagnosis of AKP were employed and the researcher was reasonably confident that subjects who claimed self-diagnosed AKP met the inclusion criteria of this study. However, future studies should include

only those subjects with a medical diagnosis of AKP or PFPS for greater reliability and validity.

The incidence of knee pain is not well documented. A number of military studies report a high incidence of knee pain or knee injuries among military recruits (Heir, 1998; Jordan & Schwellnus, 1994; Shaffer, Brodine, Ito, & Le, 1999; Snoddy & Henderson, 1994) with AKP rated as one of the most common reasons for seeking medical care during military training periods. Studies that address treatment of AKP do not provide data related to the epidemiological incidence of AKP (Arroll, Ellis-Pegler, Edwards, & Sutcliff, 1997; Eldeen, Dainer, Barrack, & Alexander, 1991), thus, making it difficult to determine the seriousness of this malady. The relatively high frequency of subjects in this study with AKP, albeit 51% without confirmed medical diagnosis and confirmatory diagnostic studies, suggests that the problem is widespread among military populations.

Research Hypothesis 1: There is no difference in the frequency of health promotion behaviors between active duty military shipboard personnel who do not have anterior knee pain and those who do have anterior knee pain.

There are no previous studies that examined the frequency of health promotion behaviors and AKP among shipboard personnel. In this study, the AKP group scored significantly and consistently lower on the total HPLP II score and all six subscales.

In a different, yet related study, Simmons (1993) found that active duty military personnel who were older, officers, shore-based, married and who reported higher levels of perceived health status had higher overall scores on the HPLP I total

and subscale scores among a random sample of 421 active duty Navy personnel, 54% of whom were stationed aboard a ship. The HPLP I included of a self-actualization subscale and the HPLP II does not. Also, the HPLP I did not have a spiritual growth subscale. In this study, only perceived health status served as a predictor variable for performance of HPB's.

It is possible that the disparity of scores between the two groups may be attributed to the presence of AKP. It is more challenging to engage in physical activity, especially running, when AKP is present. Engaging in physical activity is frequently perceived as healthy and often as a social event. If those with AKP were not able to participate, it is likely they may engage in less healthy behaviors related to nutrition, health responsibility, stress management, interpersonal relations and spiritual experiences.

It is also likely that being onboard a ship may inhibit or prevent participating in health promoting behaviors. Subjects with and without knee pain rated time as the most important factor for participating in exercise. Shipboard personnel are often on duty 12-14 hours per day leaving little time for exercise, personal time, meals, and sleep.

Access to equipment and gym space were the second and third most important factors of exercising. When a military member has the time, these factors may contribute to an inability to exercise. Further research on barriers to physical activity may be needed as well as issues that contribute to other health promoting behaviors such as seeking health care, managing stress, developing relationships, eating well and engaging in spiritually meaningful events.

Hypothesis 2: There is no difference in Navy PRT scores between active duty shipboard personnel with or without knee pain.

Complex differences between the two groups were evident and statistically significant. More subjects with knee pain scored outstanding or satisfactory, pass or fail on the PRT. More subjects without AKP scored either excellent or good. This finding is somewhat perplexing. No previous studies are available for comparison.

Only one subject failed the PRT and this was not due to AKP. Six persons were awarded a passing grade on the PRT but were unable to complete the run portion of the PRT. Four subjects out of these 6 subjects reported AKP as the reason for not running. One subject cited other reasons for not running the PRT but did report experiencing AKP and one subject did not have AKP.

Several explanations for the findings related to performance on the PRT might be offered and warrant further research. First, in this study, those subjects who were higher in rank (SES), higher level of education and lower BMI's were more likely to score higher on the PRT. As noted previously, several studies support the findings that SES, education, and BMI are variables associated with a greater frequency of engaging in health promoting behaviors. Health promoting behaviors are also associated with higher levels of fitness. The subjects who scored well on the PRT may be more physically fit overall, regardless of the presence or absence of AKP. To understand this more full would require a longitudinal study that examined PRT performance before and after persons developed AKP.

A second explanation might be found within the culture of the military. It is an expectation that all military personnel will pass the PRT because it is considered a

measure of physical fitness and operational readiness and therefore a measure of fitness for duty in the armed services. Persons who are motivated to stay in the Navy may be determined to pass or excel on the PRT.

Third, how well the military member performs on the PRT is directly linked to annual performance appraisals. A higher score on the PRT contributes to a higher score on "military bearing". Once again, those subjects with AKP may be motivated by the desire to achieve the highest possible score on an annual appraisal. The pain associated with running the PRT may be overcome by the need or obsession to do well and stay competitive with one's peers.

Finally, one can achieve a high score on the PRT merely by completing the maximum number of push-ups and sit-ups while meeting only minimal requirements for run time. Those persons with AKP may choose to maximize push-ups and sit ups, then perform the run at a pace conducive to minimal or no pain.

Hypothesis 3: There is no difference between active duty military shipboard personnel with or without anterior knee pain on participation in a routine personal fitness program, BMI, perceived barriers to exercise, perceived benefits of exercise, frequency of health promotion behaviors and perceived health status.

All participants indicated they participated in a personal fitness program which varied widely on the type of physical activity they performed. Nearly 61% indicated they exercised three times a week for 40 minutes. This is consistent with the DoD survey where more than half (58.9%) of Navy personnel reported that they engaged in some type of strenuous exercise at least 3 days per week for at least 20 minutes per occasion (DoD, 1998).

The PFQ included an item that asked what exercise the subjects performed, but did not include an assessment of how often or how long. This information might prove useful in future research in order to obtain a better picture of what the participants considered "physical activity" and could then be quantified into measures of aerobic (cardiovascular) and anaerobic (muscle building) fitness.

There were no statistically significant differences among AKP subjects who changed their personal fitness program and the variables, benefits of exercise, barriers to exercise, HPLP II scores or BMI. It is unknown exactly how the AKP subjects changed their personal fitness program and what barriers they may have experienced. Further exploration of these concepts may yield information that would help nurses direct the focus of engaging in and maintaining physical activity in the presence of AKP among shipboard personnel.

As reported earlier, the no-AKP group in this study had significantly higher scores on the HPLP II and it's subscales than did the AKP group. Despite a reported greater participation in health promoting activities among military members over time (Simmons, 1993; Trent & Hurtado, 1998), findings also indicate an increase in BMI over time (DoD, 1998; Trent & Hurtado, 1998). In this study, 38.9% of the AKP group and 28.9% of the no AKP group had a BMI greater than 26. Consistent with the findings by DoD (1998) and Trent & Hurtado (1998), this study showed a higher prevalence of overweight among men than with women and among non-whites than with whites.

Health promoting behaviors include many behavioral and cognitive actions. The overall high rate of BMI's greater than 26 demands further study. It is important

to note that other high-risk behaviors may contribute to weight gain or other negative health consequences, such as smoking and alcohol consumption, which were not examined in this study.

The subjects in the no AKP group perceived greater benefits to exercise but there was no difference between the groups on barriers to exercise. It is possible that those with AKP may not know how to exercise within the limits of this syndrome and therefore do not attain the same positive feedback from exercise.For example, if the subject's primary form of exercise were running 20-30 miles per week and he is unable to do so under the influence of AKP, he may not be able to attain the same feelings of satisfaction and well-being with an alternate exercise such as walking.

In a study by Nelson (1991), where she examined perceived benefits of and barriers to exercise between a group of women with Stage 1 breast cancer and a healthy cohort, findings indicated that those without breast cancer scored higher on the EBBS. Nelson speculated that this finding may be influenced by the breast cancer group consisting of a higher number of non-exercisers and an unknown degree of disability. Regardless of the reasons persons with some type of infirmity may be less inclined to engage in exercise, it is important to individualize exercise programs.

Perceived health status is a commonly measured concept in health promotion studies (Gillis & Perry, 1991; Martinelli, 1999; Nelson, 1991; Pender, Walker, Sechrist, & Frank-Stromborg, 1989; Volden, Langemo, Adamson, & Oechsle, 1990). In this study, the group without AKP and those persons of higher rank were more likely to have a higher perception of their health status. In addition, and consistent with previous studies, those persons with higher perceived health status were more

likely to perceive more benefits of exercise and fewer barriers to exercise, as well as score higher on the HPLP II and four of the six subscales; physical activity, nutrition, spiritual growth, and stress management (Martinelli, 1999; Nelson, 1991; Pender, Walker, Sechrist, & Frank-Stromborg, 1989).

Hypothesis 4: There is no difference between the two groups of active duty military personnel with or without AKP on the basis of gender, age, ethnicity, marital status, education, rank (SES), or time in service.

There are no previous studies comparing a group of AKP shipboard subjects with a group of no-AKP shipboard subjects and performance on the PRT. Age, gender and BMI were not statistically significant variables. The AKP group tended to be white, married, more educated, predominantly in the E7-O5 rank (and therefore had higher SES), and had more years in the service.

Women have been frequent subjects of military studies or reviews on orthopedic injuries (Deuster, Jones, & Moore, 1997; Heir, 1998; Shaeffer, Brodine, Ito, & Le, 1999). Heir (1998) found that older military officer cadets were more likely to experience a musculoskeltal insult while Edeen, Dainer, Barrack, & Alexander (1991) found that age and time in service were predictors of returning to work following conservative treatment of AKP.

Kelley (2000) examined two healthy groups (310 subjects) of shore-based military personnel. The groups were divided into those who did not pass the PFT and those who did. Gender, race, education and rank (SES) were identified as major predictors of personal physical fitness. Females and college educated persons were three times more likely to be physically fit and pass the PRT. Her results also

indicated that those military members who were overweight (consistent with BMI > 26) were less likely to pass the PRT.

HPB and Demographic Variables

Gender is consistently identified and associated with participation in physical fitness programs and frequency of performing HPB (Martinelli, 1999; Simmons, 1993). Females tend to score higher than males on many health promoting behaviors such as exercise (Gillis & Perry, 1991; Felton & Parsons, 1992; Felton, Parsons, & Bartoces, 1997), nutrition and dietary habits (Felton, Parsons, Misener, & Oldaker, 1997; Trent & Hurtado, 1998; Volden, Langemo, Adamson, Oeschsle, 1990) and stress management (Gillis & Perry, 1991; Trent & Hurtado, 1998)

Age and education has been associated with increased dietary concerns and greater sense of health responsibility (Volden, Langemo, Adamson, Oeschsle, 1990), and performing HPB with greater frequency (Simmons, 1993; Trent & Hurtado, 1998). Implications for positive findings related to demographics are examined below.

In general, women seem to demonstrate a greater commitment to developing and maintaining health promoting behaviors and may value health more than men. It may be important to identify the triggers that would motivate men toward adopting more HPBs.

It is said that "wisdom comes with age" and there are no magic bullets to increase one's sense of health responsibility. However, health promotion practices need to begin at home when individuals are young and carried well into adulthood. Family oriented health promotion programs, health fairs, and fun-runs are examples

of targeting the entire age spectrum. Educational programs for physical activity, nutrition, stress management, spirituality, health responsibility, and interpersonal relations can be targeted for all age groups.

Implications for Nursing

Nursing Practice

Health promotion behaviors are important indices of personal well-being and disease prevention. Although there were significant findings between health promotion behaviors and AKP, the underlying relationship remains unclear. Subjects with AKP were less likely to engage in health promoting behaviors. This may be related to functional, cognitive or behavioral origins and is discussed further in the implications for research section.

Nurses in clinical practice have an obligation to assess a client's ability and willingness to engage in health promoting behaviors. The Military Healthcare System (MHS) already employs the use of a health assessment form for all active duty members. However, it is unclear how well this instrument is reviewed for clues to an individual's health risks, what measures are prescribed and how effective the measures are over time.

With trends in healthcare moving toward outpatient care, more Navy nurses are assigned to active duty healthcare clinics, most major specialty clinics such as orthopedics, and to ships. They are in the position to evaluate health promoting activities, educate persons on specific needs such as annual pap exams, smoking cessation, hypertension screening and in the case of AKP, advise clients on conservative treatment for AKP such as quadriceps training exercise, rest, and

modification of physical activity. Nurses might also initiate and participate in worksite health promotion programs, seminars, and health fairs for the active duty population and their families. An emphasis on the diagnosis and treatment of AKP could be promoted.

The prevalence of knee pain onboard ships seems to be quite high as evidenced by the participation rate of military personnel with AKP who volunteered for this study. It is a very common musculoskeltal complaint in orthopedic, sports medicine, and primary care clinics. This study showed no evidence of a relationship between the presence of AKP and outcome on the PRT score. If this finding is valid, the implications for practice would focus on strategies to assist the client to manage pain associated with preparing for and running the PRT and to provide the time and access to equipment for quadriceps training exercises which to date is the most effective treatment for AKP.

Persons with AKP are not likely to develop pathologic abnormalities or chronic disability (Kannus, Natri, Paakkala, & Jarvinen, 1999; Nimon, Murray, Sandow, & Goodfellow, 1998). However, the pain of AKP is real and persons with AKP should be encouraged to avoid the physical activities that cause pain and adopt alternative exercise to maintain physical fitness.

Nursing Education

Navy nurses assigned to primary care clinics, ships and specialty clinics need to be aware of the objectives and intent of Healthy People 2010 and specifically on the newest instruction on the Navy's Physical Readiness Program (DoN, 2000). It is important to understand the focus of these programs and current trends as outlined in

the 1998 DoD survey of health related behaviors among military personnel. Access to the information and opportunities to discuss findings and design programs to meet the needs of active duty military members are critical to success. Many educational programs are already available to active duty personnel and their family members. Others need to be created and both require long-term evaluation of their use and effectiveness.

In this study, the presence of AKP had a significant relationship to performance of health promoting behaviors. In addition, several biologic and sociocultural characteristics (such as age, gender, rank, time in service, BMI, and perceived health status) were associated with health promotion. Two important indices of health promotion behavior, smoking and alcohol consumption, were not examined. It might be useful to include these variables in further studies related to performance on the PRT and HPB.

During patient encounters, nurses could take the opportunity to discuss factors that promote or interfere with an individual adopting and maintaining health promoting behaviors. Since this study focused on persons assigned to ships, nursing seminars and conferences could include special segments on health promotion programs that are directed to shipboard personnel.

Finally, nursing education at the baccalaureate and graduate level must place a strong focus on health promotion and disease prevention curriculum. More nurses are going into primary roles in health promotion and advanced practice nurses as health care providers.

Nursing Research

An unexpected finding in this study was a lack of correlation between AKP and performance on the PRT. The most likely explanation for this is a cultural one. Military culture emphasizes the importance of physical fitness within its primary mission of operational readiness. Physical fitness is also linked to job performance and promotions. Active duty members are motivated to do well on the PRT in order to stay in the military, become promoted, and receive first-rate job performance ratings to be competitive with their peers. Enduring the pain associated with AKP may be a small price to pay for the benefits of achieving a high score on the PRT. Factors associated with military culture and performance on the PRT deserves further research.

It may prove useful to examine the concept of pain (intensity, modifying factors, and coping strategies) associated with AKP during or in preparation for running the PRT. In addition, it would be interesting to examine the relationship between the significance of pain to the individual and desire to score well on the PRT.

Although inconclusive, military persons seem to be an overall high-achieving group in the area of personal demeanor and fitness. Active duty military personnel enjoy a certain reputation of admiration and respect by many. Perhaps the desire to live up to high standards set by previous generations or as a reflection of personal character, today's young men and women in the military may be more likely to commit to a higher level of physical fitness. Societal pressures related to physical appearance may also play a role in the cultural influences to look good and feel good. Societal influences, such as affiliation with other runners and social recognition

might also be explored. The organizational culture, perhaps as specific as the department where one is assigned might provide very good information on willingness and level of support from the persons in charge to encourage and optimize time for personal or group exercise, implementation of health promoting behaviors in the workplace, and individual counseling when warranted. Examination of perceived well being and locus of control might provide useful insights.

Significant demographic findings in this study were consistent with other studies on health promotion. Age, gender, ethnicity, SES, and education warrant continued evaluation in future research to pinpoint segments of the population in relation to the health- or disease-oriented focus of the study.

The model proposed in this study warrants further evaluation and refinement. The findings in this study suggested that BMI and length of time with the diagnosis of AKP were the only concepts in the model related to overall performance on the PRT. Both concepts were part of the individual characteristics and experiences. No behavior-specific cognitions and affect were related to the outcome variable, performance on the PRT. There was some evidence of relationships among other variables in the model.

It is possible that a failure to identify significant relationships between the major variables with performance on the PRT were related to the statistical design of this study. Demographic variables required re-categorization due to an insufficient number of subjects in some categories (ethnicity, education, and rank). Age was grouped into four categories but might have proven more significant if specific age-in-years were used.

The PFQ was a researcher-designed instrument that had not been pilot tested prior to use in this study. Statistical analysis on some parts of the instrument were complicated by the design of the instrument and missing responses. The instrument may have been difficult for subjects to understand and to follow the directions to completing the form. The shipboard factors were inadequate to describe or define significant relationships between the variables or their influence on the presence of AKP or performance on the PRT. Concepts in the instrument were confirmed as valuable by many of the subjects who verbally related their perception that the shipboard environment was a major concern for them. Specific questions need to address an individual's personal fitness program. Questions related to the type, frequency, duration and intensity of specific exercise should be incorporated into the instrument. Further refinement of the instrument warrants consultation and collaboration with a statistician and other experts in the field.

Further research on this topic would require greater refinement in selection of subjects. It would be prudent to obtain a random sample of subjects, ensure better representation of all ages, ethnicities, and both genders. In addition, all ranks should simulate the organizational structure of the Navy if possible which would improve the generalizability of the study. It is recommended that AKP be a medical diagnosis, not self-diagnosed. Evaluation by an advanced nurse practitioner, or general practitioner would be acceptable to verify the diagnosis of AKP and when necessary, confirmation by an orthopedic physician.

A longitudinal study that evaluated performance on the PRT overtime could prove more useful when examining factors that interfere with performance in the case

of AKP or other musculoskeletal insults or injuries. A longitudinal study would permit evaluation of weight and BMI associated with each testing period and examination of the cardiovascular (aerobic) performance as well as the measures of strength and flexibility.

Alternative measures of PRT performance might include running in water. Bushman, et al., (1997) evaluated the effect of deep water run training with competitive runners. Findings indicated no significant differences on run time, oxygen consumption, or lactate thresholds. The authors suggest the use of water run training as an alternative to on-land training. Exercising in the water is considered better overall because of decreased stress on the joints and stable body temperatures. This alternative might be ideal for those with AKP or other musculoskeletal injuries and would lend itself very well to further research on outcome of PRT performance.

Summary of Recommendations for Further Research

1. Examine the influence of military culture on PRT performance.
2. Analyze the intensity and impact of pain during PRT training and testing among persons with AKP or other musculoskeletal injuries.
3. Investigate the impact of organizational culture on enagaging in health promoting activities in the workplace especially within a shipboard environment.
4. Explore the relationships proposed in this model with other healthy populations and persons with chronic illnesses such as hypertension and obesity.
5. Redesign and pilot test the PFQ for reliability and validity.

6. Consider random selection of subjects and improved representation of major demographic variables of importance to the study. This may include selection based on age, gender, race, rank, and level of education. A longitudinal design would permit evaluation of performance on the PRT overtime and allow some control over the confounding variables in this study.
7. Explore the possibility of designing a study that measures PRT performance based on running in water.

Conclusion

Although no correlation was identified between AKP and performance on the PRT, several significant relationships emerged between AKP and performance of HPB and overall results on the PRT. First, it was clearly evident that persons without AKP had a higher frequency of performing HPB. This indicates that persons without AKP are more likely to engage in health promoting activities, yet it may also be a reflection of the effects of a chronic, but not serious, illness. Participants with AKP were more likely to score in the outstanding category of the PRT than those without AKP. However, military culture may dictate PRT performance regardless of the pain associated with AKP. It is also possible that something, other than the absence of AKP, may contribute to the likelihood of engaging in health promoting behaviors in this sample. It is difficult to discern the underlying reasons for this finding, yet a relatively healthy population outscored those with a chronic disability.

Ethnicity, level of formal education, and marital status were significant variables between the two groups and may be useful in the future research design. Subjects without AKP tended to be nonwhite, never married and had less formal

education. Subjects with AKP were also more likely to be older and have more than 10 years in the service. These findings are important when designing health promotion programs related to performance on the PRT.

BMI was a significant indicator for gender, ethnicity, and education. In addition, lower BMI scores were associated with better performance on the PRT. Although males, nonwhites and the less formally educated were more likely to have higher BMI scores, the message is clear that health promotion programs need to target weight reduction and building lean muscle mass for both the AKP and no-AKP groups.

Participants without AKP also perceived more benefits of exercise than subjects with AKP. This may be attributed to the type of exercise persons with AKP can tolerate. Popular sports activities such as running, jogging, biking and basketball are notoriously stressful on the knee joint. Swimming may be considered one of the best physical activities with little to no knee joint stress, yet pools are not available on ships and many persons simply do not know how to swim well or how water sports may be used as a primary source of exercise.

Finally, the data elicited from this study on shipboard influences did not yield information that was useful in detecting differences between the groups on PRT performance. This was a research design issue. It remains an important variable and further studies would require refinement and pilot testing of the instrument to elicit reliability and validity measures.

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Appendix A

DEMOGRAPHIC INFORMATION

AGE: ___ (17-19 yrs)
___ (20-29 yrs)
___ (30-39 yrs)
___ (40-49 yrs)
___ (50+)

SEX: ___ Male
___ Female

RANK: _____ (Write in: E1, E2, O1, O2 ....)

YEARS/MONTHS IN SERVICE: ____yrs ____mos

ETHNICITY ___Native American
___ African American
___ Hispanic American
___ Asian American
___ Caucasian
___ Other
(Please Specify)_____

MARITAL STATUS: ___ Never married
(check only one) ___ Married
___ Divorced
___ Widowed

EDUCATION (Highest Level completed):
___ High School or Equivalency
___ 1- 2 years College or Technical School
___ Bachelor's Degree
___ Postgraduate degree

HAVE YOU EXPERIENCED ANTERIOR KNEE PAIN FOR AT LEAST TWO (2) MONTHS? ____Yes ____No
____ right knee _____ left knee _____ both knees

Diagnosis by: doctor, nurse practitioner, physician assistant, or IDC?
___Yes __NO
Self-diagnosed? ___ Yes ___ No

HOW LONG HAVE YOU HAD ANTERIOR KNEE PAIN?
_____ number of months

Appendix B

PERSONAL FITNESS QUESTIONNAIRE

1. HAVE YOU EXPERIENCED ANTERIOR KNEE PAIN? ____Yes ____ No

If you answered YES to question 1, please answer the questions in SECTION II
If you answered NO to question 1, please proceed to SECTION III

SECTION II

2. The following are a list of treatments or therapies that are often prescribed as non-operative treatment of anterior knee pain. Please indicate (with an X) which treatments were prescribed for you. In the second column, please indicate how helpful you believed that treatment was.

NH-Not helpful **SW**-Somewhat helpful **H**-Helpful **QH**-Quite helpful **VH**-Very helpful

	PRESCRIBED	*HOW HELPFUL*					
	YES	NO	NH	SH	H	QH	VH
1. Rest							
2. Modification of activity							
3. Anti-inflammatory drugs (ex: Ibuprofen)							
4. Orthotics							
5. Patellar taping							
6. Elastic knee support/brace							
7. Quadriceps strengthening exercises							
8. Hamstring & iliotibial band stretching							

3. Has your personal fitness program changed since you developed knee pain?

_____YES _____NO

If your response is yes, please indicate TO WHAT DEGREE your exercise program has changed since you developed knee pain:

NL-Not likely **SL**-Somewhat likely **L**-Likely **QL**-Quite likely **VL**-Very likely

	NL	SL	L	QL	VL
1. My workouts take longer					

2. My workouts are more intense					
3. I exercise more frequently					

Please indicate the type of exercise do you do now?

_____

Is this different than before you developed knee pain? ____Yes ____No

SECTION III

4. PLEASE DESCRIBE YOUR PERSONAL FITNESS PROGRAM BY MARKING WHETHER THIS STATEMENT IS **TRUE** OR **FALSE** FOR YOU.
(For the purposes of this study, exercise is equal to aerobic exercise such as walking briskly (4 miles / hr), jogging, running, swimming, biking, jumping rope, squash, using a treadmill, stairstepper, rowing machine or Nordic track easy glider)

	TRUE	FALSE
When I am exercising:		
1. I exercise at least 3 times per week for at least 40 minutes each time.		
2. I know my target heart rate.		
3. I try to maintain aerobic exercise at my target heart rate for at least 20 minutes.		
4. I perform warm-up exercises before beginning my workout.		
5. I perform cool down exercises when I complete my workout		

5. Does your exercise routine change when you are underway or deployed?
___Yes ___No

6. Where do you most often perform your exercise/workout? Please circle the TWO (2) MOST frequently used sites in EACH column or write in your response on the line marked **other**.

While in homeport:
1. Fitness center (on base)
2. Fitness center (off base)
3. Outdoors (on base)
4. Outdoors (off base)
5. Ship's gym
6. Flight Deck
7. Hanger Deck
8. Forcastle
9. Anywhere I can onboard the ship
10. Other (specify)_____

While underway:
1. Ship's gym
2. During a port visit
3. Flight deck
4. Hanger deck
5. Forcastle
6. Anywhere I can on board the ship
7. Other (specify)_____

7. Please rank the following factors about exercising on a ship in the order of importance to you.

MI-most important **VI**-very important **I**-important **LI**-less important **NI**-not important

	MI	VI	I	LI	NI
1. Being outside in the open air					
2. Access to aerobic exercise equipment (treadmill, bike, rowing machine, etc)					
3. Size/space in exercise room/gym					
4. Steel-deck surface					
5. Time					

If there were other factors about being on board a ship that were most likely to influence you about exercising on the ship, please indicate your response(s) below:

___Other (write in your answer)_____

8. Please answer the following question by **circling the response** that best represents how you feel about your current health status.

I perceive my current health status as:

a. Excellent
b. Good
c. Fair
d. Poor

Appendix C
LIFESTYLE PROFILE II

DIRECTIONS: This questionnaire contains statements about your *present* way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the frequency with which you engage in each behavior by circling:

N for never, S for sometimes, O for often, or R for routinely

		NEVER	SOMETIMES	OFTEN	ROUTINELY
1.	Discuss my problems and concerns with people close to me.	N	S	O	R
2.	Choose a diet low in fat, saturated fat, and cholesterol.	N	S	O	R
3.	Report any unusual signs or symptoms to a physician or other health professional.	N	S	O	R
4.	Follow a planned exercise program.	N	S	O	R
5.	Get enough sleep.	N	S	O	R
6.	Feel I am growing and changing in positive ways.	N	S	O	R
7.	Praise other people easily for their achievements.	N	S	O	R
8.	Limit use of sugars and food containing sugar (sweets).	N	S	O	R
9.	Read or watch TV programs about improving health.	N	S	O	R
10.	Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).	N	S	O	R
11.	Take some time for relaxation each day.	N	S	O	R
12.	Believe that my life has purpose.	N	S	O	R
13.	Maintain meaningful and fulfilling relationships with others.	N	S	O	R
14.	Eat 6-11 servings of bread, cereal, rice and pasta each day.	N	S	O	R
15.	Question health professionals in order to understand their instructions.	N	S	O	R
16.	Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).	N	S	O	R
17.	Accept those things in my life which I can not change.	N	S	O	R
18.	Look forward to the future.	N	S	O	R
19.	Spend time with close friends.	N	S	O	R
20.	Eat 2-4 servings of fruit each day.	N	S	O	R
21.	Get a second opinion when I question my health care provider's advice.	N	S	O	R
22.	Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	N	S	O	R
23.	Concentrate on pleasant thoughts at bedtime.	N	S	O	R
24.	Feel content and at peace with myself.	N	S	O	R
25.	Find it easy to show concern, love and warmth to others.	N	S	O	R
26.	Eat 3-5 servings of vegetables each day.	N	S	O	R

	NEVER	SOMETIMES	OFTEN	ROUTINELY
27. Discuss my health concerns with health professionals.	N	S	O	R
28. Do stretching exercises at least 3 times per week.	N	S	O	R
29. Use specific methods to control my stress.	N	S	O	R
30. Work toward long-term goals in my life.	N	S	O	R
31. Touch and am touched by people I care about.	N	S	O	R
32. Eat 2-3 servings of milk, yogurt or cheese each day.	N	S	O	R
33. Inspect my body at least monthly for physical changes/danger signs.	N	S	O	R
34. Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).	N	S	O	R
35. Balance time between work and play.	N	S	O	R
36. Find each day interesting and challenging.	N	S	O	R
37. Find ways to meet my needs for intimacy.	N	S	O	R
38. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.	N	S	O	R
39. Ask for information from health professionals about how to take good care of myself.	N	S	O	R
40. Check my pulse rate when exercising.	N	S	O	R
41. Practice relaxation or meditation for 15-20 minutes daily.	N	S	O	R
42. Am aware of what is important to me in life.	N	S	O	R
43. Get support from a network of caring people.	N	S	O	R
44. Read labels to identify nutrients, fats, and sodium content in packaged food.	N	S	O	R
45. Attend educational programs on personal health care.	N	S	O	R
46. Reach my target heart rate when exercising.	N	S	O	R
47. Pace myself to prevent tiredness.	N	S	O	R
48. Feel connected with some force greater than myself.	N	S	O	R
49. Settle conflicts with others through discussion and compromise.	N	S	O	R
50. Eat breakfast.	N	S	O	R
51. Seek guidance or counseling when necessary.	N	S	O	R
52. Expose myself to new experiences and challenges.	N	S	O	R

Appendix D
EXERCISE BENEFITS/BARRIERS SCALE

DIRECTIONS: Below are statements that relate to ideas about exercise. Please indicate the degree to whic you agree or disagree with the statements by circling SA for strongly agree, A for agree, D for disagree, SD for strongly disagree

		Strongly Agree	Agree	Disagree	Strongly Disagree
1	I enjoy exercise	SA	A	D	SD
2.	Exercise decreases feelings of stress and tension for me.	SA	A	D	SD
3	Exercise improves my mental health.	SA	A	D	SD
4	Exercising takes too much of my time	SA	A	D	SD
5	I will prevent heart attacks by exercising.	SA	A	D	SD
6	Exercise tires me.	SA	A	D	SD
7	Exercise increases my muscle strength.	SA	A	D	SD
8.	Exercise gives me a sense of personal accomplishment.	SA	A	D	SD
9	Places for me to exercise are too far away	SA	A	D	SD
10	Exercising makes me feel relaxed.	SA	A	D	SD
11	Exercising lets me have contact with friends and persons I enjoy.	SA	A	D	SD
12	I am too embarrassed to exercise.	SA	A	D	SD
13	Exercising will keep me from having high blood pressure.	SA	A	D	SD
14	It costs too much money to exercise.	SA	A	D	SD
15	Exercising increases my level of physical fitness.	SA	A	D	SD
16	Exercise facilities do not have convenient schedules for me.	SA	A	D	SD
17	My muscle tone is improved with exercise.	SA	A	D	SD
18	Exercising improves functioning of my cardiovascular system.	SA	A	D	SD
19	I am fatigued by exercise.	SA	A	D	SD
20	I have improved feelings of well being from exercise.	SA	A	D	SD
21	My spouse (or significant other) does not encourage exercising.	SA	A	D	SD
22	Exercise increases my stamina.	SA	A	D	SD
23	Exercise improves my flexibility.	SA	A	D	SD

		Strongly Agree	Agree	Disagree	Strongly Disagree
24	Exercise takes too much time from family relationships.	SA	A	D	SD
25	My disposition is improved by exercise.	SA	A	D	SD
26	Exercising helps me sleep better at night.	SA	A	D	SD
27	I will live longer if I exercise	SA	A	D	SD
28	I think people in exercise clothes look funny	SA	A	D	SD
29	Exercise helps me decrease fatigue	SA	A	D	SD
30	Exercising is a good way for me to meet new people	SA	A	D	SD
31	My physical endurance is improved by exercising.	SA	A	D	SD
32	Exercising improves my self-concept	SA	A	D	SD
33	My family members do not encourage me to exercise.	SA	A	D	SD
34	Exercising increases my mental alertness.	SA	A	D	SD
35	Exercise allows me to carry out normal activities without becoming tired.	SA	A	D	SD
36	Exercise improves the quality of my work.	SA	A	D	SD
37	Exercise takes too much time from my family responsibilities.	SA	A	D	SD
38	Exercise is good entertainment for me.	SA	A	D	SD
39	Exercising increases my acceptance by others	SA	A	D	SD
40	Exercise is hard work for me.	SA	A	D	SD
41	Exercise improves overall body functioning for me	SA	A	D	SD
42	There are too few places for me to exercise	SA	A	D	SD
43	Exercise improves the way my body looks.	SA	A	D	SD

Risk Factor Screening / Physical Readiness Test Results											Page 1	
Name (Last, First, MI)	Rate / Rank	Dept		Division		Social Security No		Date of Birth		Sex		
Section A. - Current Physical Examination (To be completed by an authorized medical department representative (AMDR) at the time of each periodic physical examination)												
Date of Examination (DD/mm/yy)												
Date of Next Required Examination (dd/mm/yy)												
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Did member test positive for Sickle Cell Trait ?												
ADMR's name and signature or name and signature of person verifying physical examination (include date of verification, from number)												
Schedule date of upcoming Physical Readiness Test (To be completed by CFC)	**Date :**		**Date :**		**Date :**		**Date :**		**Date :**		**Date :**	
SECTION B. Risk Factor Questionnaire (To be completed by member)												
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
1. Are you now 50 or older and not accustomed to the level of exercise involved in the PRT ?												
2. Do you have a history of heart disease or high blood pressure which requires you to restrict physical activity activity or seek medical treatment ?												
3. Do you experience discomfort in your chest, arms or neck while exercising ?												
4. Are you prone to heat exhaustion / heat stroke, feeling faint, or feeling you are about to lose consciousness ?												
5. Has there been a change in your medical condition which you think might limit your participation in the PRT (or a physical conditioning program ?												
6. Has any member of your immediate family (mother, father, sister or brother) had a heart attack or died of heart disease prior to age 45 ?												
7. Have you experience a significant weight change ?												
8. Do you use tabacco products daily ?												
Date Section B completed (dd/mm/yy)												
Member's Signature												
Section C. Body Composition Screen (To be completed by CFC)												
Date Section C. completed (dd/mm/yy)												
1. Height (*without shoes in inches to the nearest 1/ 2 inch)*												
2. Weight (*in shorts / PT gear and without shoes in pounds*)												
3. Neck *(round up to the nearest 1/2 inch)*												
4. Abdomen *(males only) (round down to nearest 1/2 inch)*												
5. Natural Waist *(Females only) (round down to nearest 1/2 inch)*												
6. Hip *(Females only) (round down to nearest 1/2 inch)*												
7. Body Fat Percentage												

e (Last, First, M.I.)	Rank / Rate	Page 4

ION G - Command Directed Physical Conditioning Program (To be completed by CEC)

Items	Raw Score	Points	Category	Raw Score	Points	Category	Raw Score	Points	Category
Body Fat									
- reach									
rl - ups									
sh - ups									
mile run / walk or									
0 yard swim									
crall classification									
of Assessment (*dd/mm/yy*)	DATE	AGE ON DATE OF ASSESSMENT		DATE	AGE ON DATE OF ASSESSMENT		DATE	AGE ON DATE OF ASSESSMENT	

Items	Raw Score	Points	Category	Raw Score	Points	Category	Raw Score	Points	Category
Body Fat									
– reach									
rl – ups									
sh – ups									
mile run / walk or									
0 yard swim									
crall classification									
of Assessment (*dd/mm/yy*)	DATE	AGE ON DATE OF ASSESSMENT		DATE	AGE ON DATE OF ASSESSMENT		DATE	AGE ON DATE OF ASSESSMENT	

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mpleted Program			

PRIVACY ACT STATEMENT

AUTHORITY: *TITLE 5, U.S. CODE, 301 OPNAVINST 6110.1E*

PRINCIPAL PURPOSE: *TO PROVIDE THE COMMAND FITNESS COORDINATOR WITH THE NECESSARY INFORMATION TO SCREEN FOR POTENTIAL HEALTH RISKS PRIOR TO PHYSICAL READINESS TESTING AND TO RECORD TEST RESULTS*

ROUTINE USE: *FOR OFFICIALS AND EMPLOYEES OF THE DEPARTMENT OF THE NAVY IN PERFORMING THEIR OFFICIALS DUTIES OF ADMINISTERING THE HEALTH AND PHYSICAL READINESS PROGRAM*

MANDATORY DISCLOSURE AND CONSEQUENCES OF REFUSAL TO DISCLOSE: *DISCLOSURE IS NECESSARY TO FULLY EVALUATE MEMBER'S READINESS TO PARTICIPATE IN MANDATORY PHYSICAL READINESS TESTING. FAILURE TO PROVIDE THE REQUEST INFORMATION MAY PRECLUDE PARTICIPATION IN PHYSICAL READINESS TESTING AND MAY*

Appendix F

NAVAL MEDICAL CENTER
SAN DIEGO, CALIFORNIA 92134-5000

CONSENT *BY A SUBJECT* FOR VOLUNTARY PARTICIPATION IN A CLINICAL INVESTIGATION (RESEARCH) STUDY

1. I, _____, have been asked to voluntarily participate in a research project entitled, "**Comparison of Health Promotion Behaviors and Performance on the Navy Physical Fitness Test among Active Duty Personnel with and without Anterior Knee Pain and who Serve Aboard a Military Ship**," being conducted at the Naval Medical Center, San Diego by medical researchers from the Department of Nursing.

2. The objective of this research project is to identify whether or not health promoting behaviors such as exercise, the kinds of food I eat and how I handle stress, has an affect on my performance on the Navy physical fitness test (PFT). I will be in one of two groups of active duty military personnel. One group will be those without knee pain and the second group includes those with knee pain. The researcher is interested in persons who currently serve on a ship or who have recently served aboard a ship because of the possible effect exercising on board ship has on my knees and my performance on the Navy PFT.

A second objective of the study is to determine the presence or absence of tenderness and puffiness along the inside of my leg, just below the knee joint. The presence of tenderness and puffiness is thought to be related to osteoarthrosis or developing arthritis when I am older. The researcher is interested in whether or not this early sign of osteoarthrosis is present in persons with otherwise normal knees.

3.I understand that my participation in this research project will be for a period of 30-45 minutes.

4.The procedures for this project include completing four (4) questionnaires. The first one asks questions about my age, sex, marital status, rank, ethnicity, education, time in the military, and whether or not I have knee pain. The second questionnaire asks about my personal fitness program and how the shipboard environment influences my exercise program. The third questionnaire asks what I think are benefits to exercising and

Subject's Initials: _____

CPHS/IRB Approval Stamp/Seal Required

CPHS APPROVED DATE 1/24 INT ___ NAVAL MEDICAL CENTER

what I think are barriers to exercising. The last questionnaire asks about my health promotion behaviors, such as questions about exercise, the foods I eat and how I manage stress. I will allow the researcher to have access to my most recent Physical Fitness Test results including my most recently recorded height and weight at the time of the PFT. In addition, a separate health care provider will conduct an examination of my knee to determine if tenderness and puffiness is present or absent. I will be asked to expose my knee from mid-thigh to ankle for the examination. The examiner will first observe for puffiness in both of my knees. Then he will palpate (touch) the area just below my knees and ask me if I feel any tenderness to the touch.

I will be able to complete the questionnaires at my convenience on board the ship or in the clinic where I meet the researcher. If I am unable to complete the questionnaires because I do not have the time, the researcher will give me a self-addressed, stamped envelope with the questionnaires inside. I can complete these at my convenience at home or work and then mail them to the researcher. I understand that the researcher will pay for the cost of mailing the questionnaires.

If I am unable to complete the examination of my knees, I will make an appointment with the examiner to complete the examination. This appointment will be at a time and place that is convenient for me.

5. Specifically, I am aware that the research part of this project is completing 4 questionnaires about my personal fitness program, my knee pain (if I am one of the persons with knee pain who is participating in this study), the benefits and barriers to exercising and things I do to keep me healthy and allowing the researcher to have a record of my most recent PFT results including my height and weight. In addition, I am aware that the research part of this project includes allowing a health care provider to examine my knees for tenderness and puffiness.

6. A total of 230 subjects are expected to participate in this study.

7. This study has no influence on my career. y name will not be used in connection with this study. The only discomfort I may experience is the time it takes me to complete the questionnaires. I understand that I may withdraw from the study at any point.

8. I understand that my participation in this research project will not be of direct benefit to me personally. However, the

Subject's Initials: _____

CPHS/IRB Approval Stamp/Seal Required

results of this study may help the investigator gain important knowledge about health promotion behaviors that are conducive to a good outcome on the Navy PFT, reduced risk for developing anterior knee pain, identifying a sign of early development of osteoarthrosis or aid in the future medical evaluation or treatment of other patients.

9. The alternate procedure(s) or course of treatment, should I decide not to participate in this research study, has been explained to me as follows: since no treatment is involved, there is not an alternate procedure or treatment.

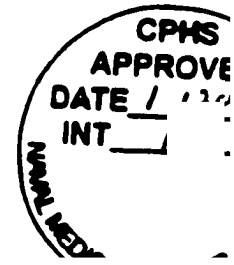
10. In all publications and presentations resulting from this research study, information about me or my participation in this project will be kept in the strictest confidence and will not be released in any form identifiable to me personally. However, I realize that authorized personnel from the Navy Medical Department and from the Food and Drug Administration (FDA), where applicable, may have access to my research file in order to verify that my rights have been adequately protected.

11. If I have any questions regarding this research study, I may contact **CAPT Robin Theresa McKenzie at (858) 673-7353**. If I have any questions about my rights as an individual while participating in a research study at the Naval Medical Center, San Diego, I may contact **CDR(s) Kenneth Earhart, MC, USN, Chairman, Committee for the Protection of Human Subjects at (619) 532-8125, or CDR Robert Foss, DC, USN, Head, Clinical Investigation Department at (619) 532-8127**. If I believe that I have been injured as a result of my participation in this research study, I may contact **CDR Lynn McNees, JAGC, USN, Naval Medical Center, San Diego, Legal Department, at (619) 532-6475.**

12. I understand that my participation in this project is entirely voluntary and that my decision not to participate will involve no penalty or loss of benefits to which I am entitled under applicable regulations. If I choose to participate, I am free to ask questions or to withdraw from the study at any time. If I should decide to withdraw from the research project, I will notify **CAPT Robin Theresa McKenzie at (858) 673-7353** to ensure my timely removal from the study. My withdrawal will involve no prejudice to my future health care or any loss of rights or benefits to which I am otherwise entitled. Any new significant finding developed during the course of this study which might affect my willingness to continue participation will be communicated to me.

Subject's Initials: _____

CPHS/IRB Approval Stamp/Seal Required



13. The investigator may terminate my participation in this study for the following reasons: (a) I do not fully meet the inclusion criteria, or (b) I was unable to complete the Navy PFT.

14. I understand that I am making a decision whether or not to participate in the research project described in the preceding sections subject to the conditions of participation described above. My signature indicates that I have decided to participate, having read and understood the information presented above and having been given the opportunity to ask any questions that I might have about the research study or my participation in the study. Further, my signature indicates that I have been provided with a copy of this consent document and a copy of a document entitled, "California Experimental Subject's Bill of Rights."

SIGNATURES AND **DATE** SIGNED: **PRINTED** OR **TYPED IDENTIFICATION**:

Patient / Subject (Date)	Name / Status / Sponsor's SSN
Witness (Date)	Name / Grade or Rank / SSN
Researcher/Investigator(Date)	Name / Grade or Rank / SSN

Subject's Initials: _____

CPHS/IRB Approval Stamp/Seal Required

CPHS APPROVED DATE 1/20/ INT NAVAL MEDI...

PRIVACY ACT STATEMENT

1. Authority. 5 USC 301

2. Purpose. Medical research information will be collected to enhance basic medical knowledge or to develop tests, procedures, and equipment to improve the diagnosis, treatment, or prevention of illness, injury, or functional impairment.

3. Use. Medical research information will be used for statistical analysis and reports by the Department of the Navy, the Department of Defense, and other U.S. Government agencies, provided this use is compatible with the purpose for which the information was collected. Use of the information may be granted to non-Government agencies or individuals by the Chief, Bureau of Medicine and Surgery in accordance with the provisions of the Freedom of Information Act.

4. Disclosure. I understand that all information contained in this Consent Statement or derived from the medical research study described herein will be retained permanently at Naval Medical Center San Diego and salient portions thereof may be entered into my health record. I voluntarily agree to its disclosure to agencies or individuals identified in the preceding paragraph. I have been informed that failure to agree to such disclosure may negate the purposes for which the research study was conducted.

SIGNATURES AND **DATE** SIGNED: **PRINTED** OR **TYPED IDENTIFICATION**:

Patient / Subject (Date) (if Applicable)	Name / Status / Sponsor's SSN
Parent / Guardian (Date) (if Applicable)	Name / Status / SSN
Witness (Date)	Name / Grade or Rank / SSN

CALIFORNIA EXPERIMENTAL SUBJECTS BILL OF RIGHTS

Any person who is requested to consent to participate as a subject in a research study involving a medical experiment or who is requested to consent on behalf of another has the right to:

1. Be informed of the nature and purpose of the experiment;

2. Be given an explanation of the procedures to be followed in the medical experiment and any drug or device to be used;

3. Be given a description of any attendant discomforts and risks reasonably to be expected from the experiment;

4. Be given an explanation of any benefits to the subject reasonably to be expected from the experiment, if applicable;

5. Be given a disclosure of appropriate alternative procedures, drugs, or devices that might be advantageous to the subject and their relative risks and benefits;

6. Be informed of the avenues of medical treatment, if any, availabl to the subject after the experiment if any complications should arise

7. Be given an opportunity to ask any questions concerning the experiment or the procedures involved;

8. Be instructed that the consent to participate in the medical experiment may be withdrawn at any time, and the subject may discontinue participation in the medical experiment without prejudice

9. Be given a copy of a signed and dated written consent form when one is required;

10. Be given the opportunity to decide to consent or not consent to medical experiment without intervention of any element of force, fraud, deceit, duress, coercion, or undue influence on the subject's decision; and

11. Be assured that the subject's confidentiality will be preserved and his/her name will not be released without his/her permission.

Any questions regarding this research study should be directed t the principal investigator or associate investigators. Information i available from the **Chairman, Committee for the Protection of Human Subjects**, established for the protection of volunteers in research projects at this facility by calling **(619) 532-8125** or writing the Chairman, Committee for the Protection of Human Subjects at Naval Medical Center, Clinical Research Department (Code AVA), San Diego, (92134-5000.